Opportunities for building medical education research capacity: A mixed methods study

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Abstract

Background: Providing evidence-based, high-quality medical education requires a solid research base with ongoing development. Academic teachers in medical schools are expected to establish and maintain research involvement as part of their university appointment. This paper used a mix of methods to explore teaching interest as a vehicle for increasing research capacity among clinician teachers.

Methods: Ten clinician teachers participated in semi-structured one-on-one interviews exploring their experiences and attitudes to medical education and biomedical research. Data were analysed thematically. From this, a quantitative survey focusing on clinical teachers' research interest and involvement was developed and administered across the medical school.

Results: Two common themes from the interviews were an expressed interest in participating in medical education research and a perceived value and relevance to clinician teachers' academic appointments. The two major inhibiting factors that were identified were a lack of time and unclear pathways to research participation. Of those surveyed, 51% were currently involved in research and 24% were interested in becoming involved in research. Perceived barriers to research participation were time (73%), lack of skills (22%) and funding (36%).

Conclusions: Increasing teacher participation in medical education research represents a significant untapped source of research output for the school, an area of important professional development for the teachers and an avenue for attaining excellence in education for the students and the institution. These are in addition to the opportunity to contribute to scholarship in teaching and learning.

Keywords: clinical educators; education research; universities.

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Introduction

Clinicians involved in teaching positions at universities are expected to participate in research activities. However, studies have suggested that clinicians lack the fundamental conceptual understanding needed to interpret research, even in their own discipline (Cooke, 2005; De Vito et al., 2009; Fritsche, Greenhalgh, Falck-Ytter, Neumayer, & Kunz, 2002; Windish, Huot, & Green, 2007). Evidence exists for the value and effectiveness of developing clinical teachers' skills in researching the educational activities in which they are already engaged (Ahmed et al., 2016; Cooke, 2005; Morahan & Fleetwood, 2008). This concept fits well with commitment to excellence in teaching and student learning in medicine (Morahan & Fleetwood, 2008), and engagement in scholarship is seen as part of the skill set of the clinician educator (Varpio et al., 2017). The challenge of providing appropriate training for medical educators to meet these clinically-relevant academic demands is widely recognised (Hu, McColl, Thistlethwaite, Schuwirth & Wilkinson, 2013; Medical Research European Science Foundation, 2012). This challenge presents a major barrier to the delivery of excellence in teaching, research and scholarship in medical schools.

There has been a groundswell of interest in high quality medical educational research, both nationally and internationally (Ahmed et al., 2016; Probert, 2014; Van Melle et al., 2012). Similarly, the "scholarship of teaching and learning" as a legitimate field of inquiry has achieved considerable traction in the wider university context (Probert, 2014) and is increasingly recognised as a criterion for performance review and promotion across the university sector (Boyer, 1990; Fincher et al., 2000; Glassick, 2000; Richlin, 2001). Reinforcing this in the Australian context is the regulatory requirement of the Tertiary Education Quality and Standards Agency (TEQSA) that all universities must demonstrate "sustained scholarship that informs teaching and learning in all fields in which courses of study are offered" (Probert, 2014, p. 3).

Yet, building capacity for medical education research is hampered by limited training options and strategies to prepare potential researchers (Ahmed et al., 2016). A recent Best Evidence Medical and Health Professional Education (BEME) systematic review reported on effective interventions to build capacity (Ahmed et al., 2016), such as research awards, writing groups, research groups and medical education teaching or scholarship programmes.

The majority of research activity in Australian medical schools is in the biomedical field. To explore if a unique opportunity exists in medical education research, the purpose of this study was to broadly examine research interests across different fields, such as clinical and public health alongside medical education research. These findings will inform the longer-term aim of developing a school-wide research strategy where medical education research is integrated along with other research interests as part of the accepted agenda.

In this study, a two-phased, mixed-methods approach was used to examine the potential for leveraging clinical teachers' interest in medical education as a conduit for wider engagement in research training and development.

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Study aims

1. To explore clinical teachers' (problem-based learning tutors and clinical tutors) experiences, attitudes and engagement in research, particularly medical education research. (Qualitative—phase 1).
2. To examine clinical teachers' level of interest and involvement in research more broadly, including both medical education and biomedical research (Quantitative—phase 2).

The findings from this study were intended to inform the potential development of a medical education research capacity building strategy.

Methods

The study context

The School of Medicine Notre Dame graduate medical programme commenced in 2008. The school offers a 4-year postgraduate medical course based in Sydney. In 2015, clinical teaching staff included 155 academics and 194 adjuncts, either as fractionally employed trained medical doctors, who facilitated the problem-based learning (PBL) sessions teaching preclinical students, or hospital-based clinicians, who taught students in the final 2 years of the programme in seven clinical schools across two states. Hospital-based clinicians were either staff specialists, who were directly employed on a salaried basis by their health service, or visiting medical officers, who were employed under a contract and paid by the hour or service provided.

Exploring clinical teachers' perspective on research, including medical education research, is often undertaken using surveys (De Vito et al., 2009; McColl, Smith, White, & Field, 1998; Vo, Carr, & Miller, 2014). We used a two-phased, mixed-methods approach. In phase 1, we conducted a qualitative study to explore clinical teachers' (problem-based learning tutors and clinical tutors) experiences and attitudes to research and engagement or interest in being involved in medical education research. In phase 2, drawing on the findings from phase 1, we conducted a survey that allowed us to quantify preferences across the school for options identified from the qualitative interviews. The survey also provided a broader, school-wide sampling of clinical teachers' research interest and involvement to inform the development of a medical education research capacity building strategy. Ethics approval for both parts of the study was obtained from the Notre Dame Human Research Ethics Committee (reference numbers 014038S and 015021S for phase 1 and 2, respectively).

Qualitative—phase 1

Interview design

The questions for the semi-structured interviews addressed the principles of evidence-based medicine (EBM) laid out as a framework by Willison and O'Regan (n.d.). We adapted this framework to incorporate Glassick's (2000) six standards for scholarship of teaching as applied to medical education research. (Table 1).

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Table 1
EBM Framework Tool for Semi-Structured Interviews

Finding, Using and Doing Research	**Identify need** (define the problem/ priority)	**Find evidence** (systematic reviews, evidence summaries, practice guidelines, individual papers)	**Critically appraise** quality of journal articles and reviews	**Apply research evidence to patient care** (EBM)	**Apply research evidence to medical education**	**Do research** (formulate researchable questions, objectives, methods, prepare funding applications)	**Publication** (writing for journal publication)
Broad Biomedical/ healthcare research	*1) Do you come across problems or questions for which you rely on research?*	*2) Do you ever need to search the medical literature? What sources? How often?*	*3) How confident do you feel about critically appraising the quality of biomedical research?*	*4) How do you use research in your clinical practice?*	*5) Do you use biomedical research in your teaching? In what ways? How often?*	*6) Have you ever been involved in any research activities? What types of studies were they? Are there any (other) areas of research enquiry that you could be really interested/ excited about? (How likely are you to do it; what would help you?)*	*7) If involved in research, have you written/ published research papers?*
Focused Medical education research	*Are there aspects of your teaching that you reflect on or would like to improve? What things promote this reflection? (e.g., student feedback, personal observations, discussion with other tutors? What sort of things do you want to improve?*	*Do you ever search for medical education literature?*	*If you read medical education research papers, would you feel able to judge the quality of a piece of medical education research?*	*N/A*	*If you decide that you want to make changes to your teaching, how do you decide what changes to make? Do you ever look for research to help your decisions?*	*Have you ever been involved in any educational research? How did you get involved? Would you do it again? Why/why not? Do you ever collect your own evidence about your teaching? Do you make changes in your own teaching and observe student responses for changes? (action research)*	

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Population and recruitment

We recruited purposively, aiming to have representatives from the school with different roles and with a spread of research experience. Initial contact was made via an email sent to selected sessional academic teaching staff and clinical teaching staff, informing them of the study and inviting them to participate.

Interviews

The interviews were conducted by one or two of the investigating team (SS and LR), using the semi-structured framework already described. Each interview was digitally recorded. Interviews had an average duration of 26 minutes.

Analysis

Digital recordings were transcribed verbatim. A thematic analysis of the transcripts was conducted by two of the research team (SS and LR). The two researchers independently read and coded the first few transcripts for items related to the study questions, e.g., current research activity, challenges of doing research, motivations for research, commitment to excellence in teaching, etc. We applied deductive coding to describe participants' experience and interest in research, in line with our interview framework (Gale, Heath, Cameron, Rashid, & Redwood, 2013). We also looked for unanticipated concepts and/or relationships and coded those inductively from the data. The emerging themes were then discussed and combined, and the relationships between the combined themes were explored in the transcripts and subsequent interviews. The interviews and analyses were then reviewed by the investigators as a group, with a consensus attained regarding the final analysis.

Quantitative—phase 2

A 15-item survey was developed to determine: the prevalence of research activity and research interest among clinical teachers across the school; common barriers and facilitating factors; and research training, perceived skills and identified training needs. These items were identified by the research team as being of relevance to both understanding the current research capabilities of the school and to designing a strategic plan for increasing research output[1].

Population

All of the medical school's clinical teachers were eligible to participate.

Survey design

Questionnaire items about facilitating factors and training needs were developed to quantify preferences across the school for options identified from the qualitative interviews. The item about research barriers was open ended to elicit the range of barriers across the school. Questionnaire items about previous research training and perceived skills were drawn from a previously validated tool (McColl et al., 1998).

1 Survey available from author on request

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Survey

To maximise participant numbers, the survey was distributed on paper at meetings at each clinical school and with year PBL tutor groups, with the support of the heads of the clinical schools and PBL year coordinators. It was also available online via an emailed weblink.

Analysis

Data were analysed using descriptive statistics.

Results

Qualitative

Nineteen individuals were approached for interviews; 10 consented. The number of interviews required for thematic saturation proved to be eight. After this number of interviews, analysis revealed consistent repetition of previously identified themes, concepts and explanations.

All interview participants had some research experience, either in the biomedical field or as part of medical education research projects. A number had medical education research experience in association with their participation in the university's Graduate Certificate of University Teaching. Half of the participants had experience in both biomedical and medical education research (Table 2).

Table 2
Prior Research Experience of Participants in the Semi-Structured Interviews

Participant	Area of research experience
1	Biomedical and medical education
2	Biomedical and medical education
3	Medical education
4	Biomedical
5	Biomedical
6	Medical education
7	Medical education
8	Biomedical and medical education
9	Biomedical and medical education
10	Biomedical and medical education

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A conceptual framework was derived from the results of the qualitative interviews to represent the different modes (core themes) of engagement that clinical teachers may have with research (Figure 1). The themes of using and conducting research were engaged with in the context of clinical and/or education practice. Clinical teachers reported drawing on a biomedical research base in both their own clinical practice and when teaching a medical school curriculum. In the context of their teaching practice, clinical teachers both drew on medical education research to inform their practice and conduct it themselves as an aligned and scholarly pursuit. Clinical teachers' engagement with biomedical or educational research depended upon their individual characteristics, which were relatively unchangeable, in combination with local facilitating and impeding influences. Participant quotes are used here to illustrate themes derived from the analysis of the interviews, with the source of the quote indicated by the participant number.

	CLINICAL Practice	EDUCATIONAL Practice
USING Research	Biomedical research *to inform own practice*	Biomedical research *to teach course content* Medical education research *to inform teaching methods*
DOING Research	Biomedical research *in clinical or laboratory settings*	Medical education research *in teaching context*

Figure 1. A conceptual framework for modes of engagement with research by medical educators.

In the interview phase, we were particularly interested in the potential of medical educators as active researchers and focused on their experiences of "doing research". The reported degree of research involvement ranged from principle investigator to peripheral involvement, with some participants describing their involvement as relatively minor, with no experience of developing or driving their own projects.

> *Well, we didn't design the study or anything like that, we were one of the feeders.* (P5)

Of particular relevance to our research question, the group of clinical teachers at the school were perceived as having an underlying deep interest in medical education that had potential for expanding into medical education research activities.

> *As to how many people who were doing teaching would be interested in perhaps researching teaching . . . all I can say is I think that there is a great interest for those who actually come here and are appointed as tutors—and are all clinicians I might add. They all seem to be very interested in the process of teaching.* (P1)

It was perceived that medical education research would be fundamental to quality improvement of teaching in the university context and that participation in research should, therefore, be facilitated by the university.

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Medical education research … for a university that is trying to teach to a quality standard is obviously something that you'd hope would be important and a foot in the door. (P10)

One expressed barrier to participation in research of any type was a lack of available time. With most teaching staff having fractional staff appointments, there was a necessary and logical prioritisation of the teaching aspects of their role in the utilisation of their time.

I think the biggest thing is time. I'm only here 3 days a week, so it's difficult to work that into my time here. So that's a resourcing issue. (P7)

The hospital environment was a facilitating factor to participation in biomedical research by providing access to patients with clinical conditions of interest.

It's a rare condition, but … we draw a population of about 1.6 million people . . . so I'm able to get hold of something like 25, 30 cases, which is pretty unusual worldwide experience in this. (P4)

Where hospital clinicians were employed in a capacity that was not a staff specialist position, they were much less likely to participate in research.

If you've got staff specialists, it's easy to get them involved in the research. But if they are visiting medical officers, … their time is their time, and that's the challenge to get them involved in the research. (P5)

General practitioners participated in biomedical research where they perceived it would have additional benefits, either to their practice or to their area of expertise.

I have been involved as a practice-based research [sic]. … We were interested in improving our COPD diagnosis and uptake. We also had some nurses … who would like to be trained in doing spirometry, and that was an opportunity to have our practice nurses trained. (P9)

However, these general practitioners reported that the community setting was not physically conducive to research.

The execution becomes tricky when you've really got no ancillary staff to help. … We don't have a room to accommodate a nurse, for instance. (P1)

Quantitative

The quantitative survey was informed by the qualitative findings. Questions were designed to determine the prevalence of research interest and involvement and how widely spread the perceptions raised in the interviews were, as well as questions about the identified barriers and concerns.

A total of 99 clinical teachers responded to the survey, representing a 30% response rate. Of these, 50 (51%) identified themselves as being currently involved in research, 24 (24%) as being interested in being involved in research over the next 5 years and 25 (25%) as not interested in research.

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For those currently involved in research who gave their areas of interest, 12 of 49 (24%) were involved in medical education research and 34 (69%) in biomedical research, including 5 (10%) involved in both; other areas included basic science, health services and public health research. For those interested in becoming involved in research who gave their area of interest, similar proportions were interested in medical education research (6 of 23, 26%) and biomedical research (13 of 23, 57%).

Overall, 49 of 95 (52%) respondents had formal training in literature searching and 37 of 94 (39%) in critical appraisal. Less than 50% of research-interested teachers perceived that they understand and could explain research terms such as relative risk, absolute risk, *p*-value, 95% confidence interval, confounding factor and risk of bias.

Not surprisingly, time was perceived as the major barrier to research. Lack of time was identified by 72 of 99 (73%) respondents and was the most common barrier identified by both those currently active and non-active in research. The second most common perceived barrier for those not active in research was skills (11, 22%); for those currently active in research, it was funding (18, 36%) (Figure 2).

For teachers interested in becoming involved in research, the most commonly agreed facilitating factor was easy access to people who offer one-on-one research development support (19 of 49, 39%). Other factors commonly identified were working with a research active mentor (15), joining a group research project led by an experienced researcher (16) and online resources (15) (Figure 2). The most commonly identified research skill needed was data analysis and assistance with statistics. This was also the most common first preference for research skills training.

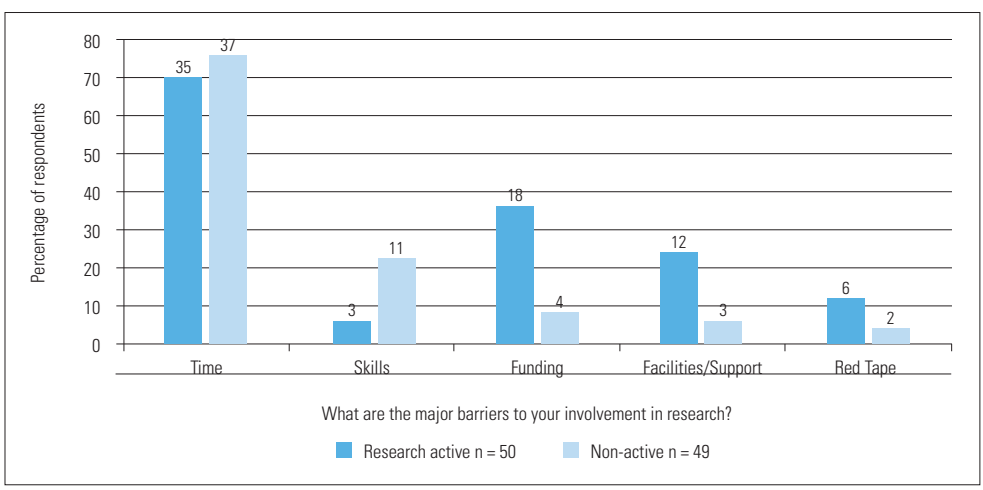

Figure 2. Perceived barriers to clinical teachers engaging in research, by current research activity status, n = 99.

The number of responses is shown above the column.

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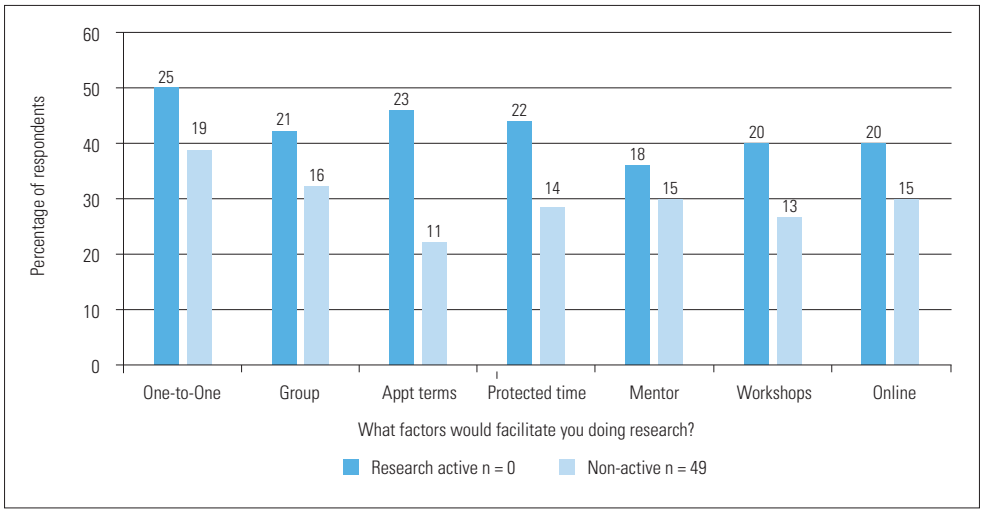

Figure 3. Factors to facilitate teacher research, by research activity status, n = 99.

Discussion

Our results indicated that our participants engaged with research via multiple modes. Figure 1 provides a representation of these modes, which could be used as a framework for supporting structured dialogue about research skills and capacity with clinical teachers, both within our own medical school and potentially in other settings throughout health professional education.

The quantitative survey provides a valuable snapshot of teacher research activity, interests, attitudes and skills to inform the development of a targeted strategy for the school to enhance research participation. Approximately one quarter of those who responded, including those not currently engaged in research, have an interest in medical education research. This supports the conclusion that an interest in teaching may provide an opportunity to develop research capacity in medical education. This conclusion warrants further exploration in other medical school settings. Furthermore, this may be reflective of other health professional education training programmes and may warrant investigation in these contexts.

The secondary finding that more than half of current teachers lack confidence in explaining basic research terms provides compelling evidence for the need to develop research understanding more generally among clinical teachers. In addition to generating medical education research, there are potential broader benefits of a research capacity building strategy in medical education, i.e., to strengthen skills required for the interpretation of clinical evidence and teaching of evidence-based medicine.

Indeed, increasing teacher participation in medical education research represents a potential source of research output for the school, an area of important professional development for the teachers, an avenue for attaining excellence in education for the

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students and the institution, and an opportunity to contribute to the scholarship of teaching and learning.

Our study was informed by previous work that considered ways of building medical education research capacity among clinical teachers whilst acknowledging lack of time as a major barrier (Ahmed et al., 2016; Morahan & Fleetwood, 2008). Interventions identified by Ahmed and colleagues (2016) included fellowships or master's programmes, such as the University of Notre Dame Master of Health Professional Education, in which a number of our clinical teachers are currently enrolled. Factors advanced by Ahmed et al. as having a positive impact on educational research—protected time, mentorship/collaboration, institutional leadership/commitment towards education research and financial support—were mirrored among those proffered by participants in our study.

This study has identified factors that may be considered for inclusion when developing a strategy for increasing engagement in medical education research. Firstly, in a time-poor environment, immediate relevance of research projects to current activities enables both research and quality improvement to take place simultaneously. Some of our clinical teachers appear likely to embrace research that will enhance their teaching activities, thus endorsing Morahan and Fleetwood's (2008) practical, applied approach to educational scholarship. University of Notre Dame's willingness to financially support our teachers to undertake higher degrees in health professional education can potentially generate research activity that is relevant to their current educational roles. Secondly, our findings have identified the critical importance of being vigilant in cutting any time burden that may exist around research. Thus, facilitating administrative processes such as simplifying and minimising forms, as well as readily accessible and carefully pitched upskilling in research methods and mentoring, are important considerations in strategies to build capacity in all areas of research at the school. Finally, clinical teachers are attracted to group projects, both as a collegial activity and as a burden-sharing strategy. In a time-poor environment, this factor may be critical to encouraging research participation. We suggest this is also a valuable topic for further exploration, both within our own and other health professional education settings.

Limitations

The response rate to the survey prevents firm conclusions being drawn as to the prevalence and types of research activities at our site. However, a significant proportion of the clinical teachers undertake the Graduate Certificate of University Teaching. Part of this course includes a module on action research, wherein teachers devise and evaluate a teaching innovation to address an identified learning need. Our survey did not enquire about teaching innovations that may already be underway. These innovations may represent nascent research-like activities that would indicate that there is even greater and more immediate research potential than that identified in the survey. Additionally, as this study took place at a single school, the applicability of the results for other institutions is limited to schools with a similar context to our own, or those where research-informed teaching is rewarded with career pathways.

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A possible risk of fostering a larger number of medical education researchers within a small medical school is over-researching the population and processes, leading to higher rates of refusal to participate and lack of generalisability of results to other institutions. To manage this risk, the school could engage in collaborative research with other medical schools to broaden the sampling base, to increase generalisability of study findings and to foster research networks, all of which are known to be facilitating factors for participation in research (Ahmed et al., 2016).

Conclusions

By weaving together clinicians' multiple roles as teacher/clinician and researcher, Morahan and Fleetwood's (2008) double helix model of "activity/practice" and "scholarship" proposes a creative win–win solution in a climate where there is an increasing call for robust higher education research. While this study has direct relevance to the strategic engagement of our group of clinical teachers, with the aim of developing a research community of practice at the school, it also provides some suggested structures and strategies for consideration in other health professional training programmes.

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