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Understanding student engagement with research: a study of pre-service teachers' research perceptions, research experience, and motivation

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This study reports on findings from a research project that investigated the extent to which pre-service teachers at a major metropolitan Australian university engage with research, and the factors that influence their level of engagement or disengagement. Results from survey responses (*n* = 235) and focus group interviews suggest that attitudes towards research are more positive among pre-service teachers who possess research experience and those who are intrinsically motivated with respect to their university studies. The article discusses the implications of these results for the effective organisation and promotion of research activities for pre-service teachers.

Keywords: motivation; pre-service teachers; research; research experience

Introduction

Engagement in research can benefit undergraduate students in several ways. Research activities assist students in interpreting the research of others (Reis-Jorge, 2005), allow students to take ownership of their learning (Todd, Bannister, & Clegg, 2004), and may lead to a deeper interest in, and understanding of, subject material (Todd et al., 2004; Turner, Wuetherick, & Healey, 2008). Research activities have also been shown to enhance undergraduate students' motivation for postgraduate study (Lopatto, 2004). Finally, researchers have noted links between undergraduate research engagement and improvements in student self-efficacy (Zambo & Zambo, 2007).

Notwithstanding these benefits, research engagement can cause students considerable anxiety. Common concerns include time limitations (Jantarakantee, Roadrangka, & Clarke, 2012), difficulties in defining the research problem (Ersoy & Çengelci, 2008), and inadequate support from academic staff (Stefani, Tariq, Heylings, & Butcher, 1997). Studies also point to the anxiety and negative expectations that many students experience when required to learn and perform statistical analysis, with many students believing that there is no way they can overcome their lack of mathematical ability (McGrath, 2014; Stefani et al., 1997) and uncertainty about gathering and analysing data (Shaw, Holbrook, Scevak, & Bourke, 2008). Indeed, some educators argue that not all undergraduate students should be required to conduct research. For example, Diezmann (2005) and Shaw et al. (2008) suggest that research projects should be given only to those students who possess the ability and motivation to conduct research. Garde-Hansen and Calvert (2007) similarly suggest that students who are assessment-driven may lack the exploratory

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curiosity required for research, while Zamorski (2002) shows that students often perceive a conflict between research and exam performance aspirations.

Given the disagreement in the literature regarding the extent to which students value and benefit from research activities, it is important to develop a deeper understanding of the factors that influence student attitudes towards research. This is particularly important for education students. Evidence-based practice in the classroom requires that teachers have the skill to seek new knowledge; the experience to critically analyse new methods and approaches; and the confidence to implement processes of inquiry to problem-solve and troubleshoot. Despite potential differences in student perceptions between disciplines (Smeby, 1998), there is little research specifically examining the research perceptions of pre-service teachers. Moreover, Deemer (2009) suggests that even amongst master's students, many fail to understand the relationship between educational research and practice. To develop a deeper understanding of the factors influencing pre-service teachers' attitudes towards research, therefore, we consider the roles of pre-existing motivation and prior research experience.

Pre-service teachers' motivation

Consistent with Self-Determination Theory (see Ryan & Deci, 2000), we distinguish between students' intrinsic and extrinsic motivation for university study by drawing on the definitions of Ryan and Deci (2000). According to Ryan and Deci (2000), intrinsic motivation refers to doing something because it is inherently satisfying. For example, students may study in order to learn and achieve greater understanding. Extrinsic motivation refers to doing something for the purpose of achieving an external goal or separable outcome (Ryan & Deci, 2000), such as studying in order to improve one's qualifications. These motivational styles are task-specific – an individual may be intrinsically motivated for one task while relying purely on extrinsic motivation for another task (Ryan & Deci, 2000). For each task, such as studying, a person's motivation falls on a spectrum ranging from purely extrinsic to purely intrinsic.

With the exception of Breen and Lindsay (1999), few studies have examined research perceptions in this context. Breen and Lindsay (1999) revealed that intrinsically motivated students more often wanted to learn about and take part in research activities, whereas students who lack intrinsic motivation were indifferent or hostile towards research. It is important to note, however, that this study explored the attitudes of students from a range of disciplines, and the extent to which pre-service teachers were sampled is unclear.

It is possible that education students possess systematically greater levels of intrinsic and/or extrinsic motivation than students in other disciplines. On the one hand, pre-service teachers possess a strong interest in developing their own and others' knowledge and skills: thus, research activities may be seen by students as a way to improve themselves as teachers (Price, 2001). On the other hand, students who enrol in education courses generally have a specific career path in mind and may not be interested in activities that appear impractical or irrelevant to the practice of teaching (Gitlin, Barlow, Burbank, Kauchak, & Stevens, 1999; Reis-Jorge, 2007). Indeed, studies show that many teachers are primarily concerned with classroom issues such as instructional strategies and teacher–pupil interactions (Beycioglu, Ozer, & Ugurlu, 2010). To our knowledge, no study has explored whether intrinsically motivated and extrinsically motivated pre-service teachers differ in the value that they place on research.

Pre-service teachers' research experience

While research suggests that meaningful, curricula-based research experiences will enhance pre-service teachers' research skills (e.g. Reis-Jorge, 2005), very few studies have examined how they might alter pre-service teachers' attitudes towards research. In one exception, Smith and Sela (2005) showed that pre-service teachers' confusion about research subsides as they engage in research tasks. Although some participants found the research process difficult, self-identity as a teacher was enhanced. In a similar study conducted in the United States, Gitlin et al. (1999) showed that pre-service teachers who had completed a research project became more likely to view themselves as potential researchers in future. It is important to note, however, both Smith and Sela (2005) and Gitlin et al. (1999) explored student outcomes during or after a specific one-off programme or action research task. Given that these particular programmes and research tasks were shared with students by the study authors – who have a demonstrable interest in supporting students' research engagement – it is plausible that greater attention was paid to skills development and scaffolding than is typically the case. In other words, these findings may represent best practice rather than typical practice. It is also plausible that pre-service teaching students' enthusiasm for research might be strongest or weakest immediately following a research task, or that it might grow or fade with repeated exposure to other similar research tasks. It is therefore important to examine the association between pre-service teachers' research experience and perceptions across the curriculum (i.e. outside the confines of a specific class or project).

The present study

In an attempt to strengthen our understanding of the factors that affect pre-service teachers' perceptions of research, this study explores two key research questions. Firstly, is there an association between pre-service teachers' engagement or disengagement with research and their own perceived research experience? Secondly, is there an association between pre-service teachers' engagement or disengagement with research and their pre-existing tendency towards intrinsic or extrinsic motivation for university study?

It is important to note that a significant association does not necessarily indicate a causal relationship. However, if there is a causal relationship, one would expect to find a significant association. If research experience causes students to value research more highly, one would expect that those with research experience would show more positive perceptions of research compared to those who lack research experience. Similarly, if intrinsic motivation for study causes students to value research more highly, one would expect that those who are intrinsically motivated for study would show more positive perceptions of research compared to those who are extrinsically motivated for study.

Method

Design

This study utilises a mixed methodology design. First, quantitative data about students' research experience, motivation, and perceptions of research were collected using an online survey instrument. To analyse data, chi-square tests of association were employed.

The purpose of a chi-square test of association is to reveal whether the observed frequencies of responses (i.e. the number of students indicating agreement or disagreement with each survey item) differ significantly between groups. We used this test to determine whether there is a significant association between students' (i) self-reported research experience (some, none) and their perceptions of research and (ii) their motivation for study (intrinsic/extrinsic) and their perceptions of research.

Second, qualitative data were collected using two focus group interviews. One limitation of survey designs is that they do not allow respondents the opportunity to respond to opposing views or engage in meaningful debate (Kitzinger, 1994). Our two focus group interviews were designed to provide more nuanced information regarding pre-service teachers' beliefs and to enable triangulation with the survey data. Note that the purpose of the focus group interviews was not to represent all members of the student population equally, but to shed light on some of the possible reasons behind the online survey responses. Ethical approval to run the online survey and focus group interviews was obtained from the relevant institutional ethics committee.

Participants

Education students at a major metropolitan Australian university received an email inviting them to participate in an online survey exploring their attitudes towards research. Out of approximately 2000 students who received the invitation (1885 undergraduates and 115 graduates), 235 students (12%) completed the survey: 43 males and 192 females. Participants included 193 undergraduates, and 42 graduates retraining as teachers. Twelve (5.22%) were studying early childhood education; 112 (48.69%) were studying primary education; and 106 (46.09%) were studying secondary education. We also asked how many subjects they had completed: 64 (33.16%) had completed less than 8 subjects, which represents the university's recommended full-time study load for one year; 42 (21.76%) had completed 8–15 subjects (second year); 30 (15.54%) had completed 16–23 subjects (third year); and 48 (24.87%) had completed at least 24 subjects (fourth year or above). Nine students (4.66%) did not respond. While those who have experienced research are more likely to be in the latter years of their degree, at least 40% of students from each year level claimed to have no research experience.[1]

Following completion of the survey, students were invited to enter an email address if they were interested in attending one of two focus group interviews to further discuss their perceptions of research. One focus group was designated for students who stated that they possessed research experience. Twenty-five students expressed interest and were contacted by email. Seven students were able to attend at the specified time: three males and four females. The second focus group was designated for students who stated that they did not possess research experience. Thirty-four students expressed interest and were contacted by email. Four students were able to attend at the specified time: one male and three females.

Materials and procedure

The survey consisted of 23 questions overall (including six demographic questions). In the first part of the survey (eight questions), respondents were categorised based on whether they believe they possess research experience. Respondents were asked: "Have you ever conducted an entire research project or part of a research project for a

Table 1.   Research perception items.

Survey item
I don't really like research
I believe the university should actively encourage undergraduate engagement with research
All undergraduate education students should learn about research at some stage of their degree
All undergraduate students should conduct at least part of a research project at some stage of their degree
All undergraduate students should conduct an entire research project at some stage of their degree

university assignment?" Students were also asked a range of optional open-ended questions allowing them to outline the research that they had completed, their views of research, and the extent to which they believe research should be promoted at the undergraduate level.

In the second part of the survey (five questions), students' perceptions of research were measured. Respondents were asked to indicate, on a 5-point Likert scale, the extent to which they agree or disagree with five statements, listed in Table 1, regarding the value of research:

The first statement was aimed at measuring students' personal attitudes towards research. The four remaining statements were designed to capture students' beliefs as to whether the university should promote research and assign research activities for undergraduate students. The four statements displayed increasingly strong views about how extensively the university should promote research.

In the third part of the survey (four questions), students were categorised based on whether they are intrinsically or extrinsically motivated with respect to their studies. Items from Breen and Lindsay (1999)'s scale are used[2]: selected due to their specific relevance to intrinsic and extrinsic motivation (see Table 2). Values were assigned to each response, ranging from 1 (strongly disagree) to 5 (strongly agree). Scores for the extrinsic motivation statements were subtracted from the scores for the intrinsic motivation statements. Respondents scoring above 0 were categorised as intrinsically motivated, and respondents scoring at or below 0 were categorised as extrinsically motivated.

Participants in each focus group were asked nine questions: two that focused on definitions of research (e.g. "what do you think research is?"), one that focused on research experience (e.g. "which subjects have you studied that involved research or a task similar to research?"), three that focused on the research process and support resources (e.g. "what resources would be most helpful for you when conducting research?"), and three that focused on attitudes towards research (e.g. "how valuable do you think research is for pre-service teachers?"). To address the possible presence of demand characteristics in focus group interviews (see Nichols & Maner, 2008), we

Table 2.   Summary of motivation items.

Survey item	Score
I am a person who is very interested in my chosen subject	Intrinsic motivation: 1–5
I view my university studies primarily as a means to a successful career	Extrinsic motivation: 1–5
I am a person whose main concern is to obtain a qualification	Extrinsic motivation: 1–5
I am a person who enjoys the intellectual life of the university	Intrinsic motivation: 1–5

employed a moderator with whom participants had little or no prior contact, and who posed questions and reacted to comments in as neutral a manner as possible. Participants were not informed of the hypotheses of the study, nor the basis upon which focus groups had been selected, until interviews were concluded. Questions were asked in a semi-structured manner, which enabled students to talk freely about that topic. The moderator did not move to the next question until participants indicated that they had nothing more to say. If the conversation moved off track, the moderator waited for the students themselves to redirect the conversation. If this was not successful, the moderator used gentle prompts to return students to the original topic. The first focus group, with students who stated that they possessed research experience, ran for 114 minutes. The second focus group, with students who stated that they did not possess research experience, ran for 78 minutes.

Results

Students' overall research experience

Of the 235 students who responded to the survey, 85 (36.17%) indicated that they had conducted part or all of a research project for a university assignment, and are thus classified as possessing research experience for the purposes of this study. The remaining 150 (63.83%) are classified as not possessing research experience. However, focus group discussions revealed that students do not necessarily characterise or define research in the same way as one another, as illustrated in the following:

Focus Group 1 – students with research experience

Felicity: I think there's two strands of research, whether you're doing ground-breaking sort of work yourself where you see a disparity in what you know and then moving forward that way and trying to progress the field, or using it as a crutch in the sense that, like, I know something so I'm going to go and look for research to actually justify and validate what I know.

Chris: Research is about narrowing your understanding, whereas exams are really broad.

Felicity: You think it's narrowing?

Chris: Absolutely it narrows.

Gemma: Sometimes.

Chris: Research is all about narrowing, narrowing further down until you get to the absolute pinnacle of what you're talking about.

Felicity: I would have to disagree.

Considering that students are likely to characterise research in different ways, it is possible that many students who claim not to possess research experience may actually possess what educators would consider research experience. Indeed, focus group discussions revealed that some students adopt quite a narrow or rigid definition of research. For example, students may consider that an assignment represents "research" only if students are allowed to define or expand upon the research topic, as illustrated in the following:

Focus Group 1 – students with research experience

Moderator: So for those of you who have done [education unit with in-built research assessment task], would you consider that to be research?

   [Belinda shakes head]

   Chris: No, not true research, no.
  Evelyn: It's sort of in a box. It's a bit, like, scaffolded. It was very much …
 Belinda: You cannot ask anything other than these questions.
   Chris: Yeah, and you didn't even get the chance to really direct a research question.
  Evelyn: But that's fair enough because they're dealing with 500 students or something.
 Belinda: Yeah, I understand, but it's not true research.
   David: I would have liked the opportunity to sort of expand on some of the questions.

Focus Group 2 – students without research experience

Moderator: You were mentioning [education unit] and the task you did in that subject. What is the difference between research and what you did in [education unit]?
    Kate: Well, all we did was gather some data. We didn't analyse it, we didn't take it any further, we didn't – there was no collaboration. There was no looking for trends or looking for any conclusions out of it. It was just simply asking questions so that we could answer questions. So I didn't – it seemed like a missed opportunity from a research perspective.

Students' overall perceptions of research

Table 3 reveals how students responded to various statements regarding their attitudes towards research and the extent to which the university should promote research activities at the undergraduate level.

The results show that students generally hold positive views about research, with only 49 (20.94%) respondents agreeing or strongly agreeing with the statement that they do not

Table 3.   Perceptions of research – frequency of responses.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I don't really like research ($N = 234$)	29	69	87	45	4
The university should actively encourage undergraduate engagement with research ($N = 234$)	2	11	59	126	36
All undergraduate education students should learn about research ($N = 234$)	1	5	31	134	63
All undergraduate students should conduct at least part of a research project ($N = 234$)	3	20	50	109	52
All undergraduate students should conduct an entire research project ($N = 233$)	10	68	95	43	17

really like research. More than 160 students (69.23%) agreed or strongly agreed that the university should encourage undergraduate engagement with research, while 197 students (84.18%) supported the statement that all undergraduate education students should learn about research. Focus group participants elaborated on why research is valuable specifically for pre-service teachers:

Focus Group 1 – students with research experience

  Gemma: I think it is valuable because when we go into the real world teaching, if there's something that we want to change or implement then we need to have, again, the skills to be able to research and find out how to put them into best practice … It's something we need to know how to do, so then we can do it in our profession.

    Chris: Yeah, it helps justify any new thing we're trying to our principal and our supervising teacher as well.

  Gemma: Yeah.

  Evelyn: It also sort of doesn't – it's that lifelong learning concept. You don't stop questioning things once you get into the profession. It's not like you just have this and then you've got a job and that's it. It's sort of keeping them honest.

  Gemma: And if we're learning then as teachers our students are learning. So we should be learning as well.

    Chris: I'd like to believe that it also helps prevent burnout rates. I mean, increased burnout rates for older teachers who don't really want to try anything new. If you've got that lifelong learning and you've got the freedom to research, then I think you will be forever trying new stuff in your classroom and stave off that burnout.

More than 160 students (66.80%) supported the statement that all undergraduate students should conduct at least part of a research project at some stage during their degree. However, only 60 students (25.76%) supported the statement that all undergraduate students should conduct an entire research project. A common view expressed during focus group interviews was that students should be given a small level of exposure to research activities early in their degree so they can develop research skills and then pursue further (optional or compulsory) research later in their degree:

Focus Group 2 – students without research experience

  Heather: I actually think it would be a good idea to introduce research like in [education unit] so you have to do a subject that has a bit of research introduced then have the elective for after that that they can choose to go on with because there will be students that really love it and students that just aren't interested so I don't think they should be forced to do it.

Focus Group 2 – students without research experience

    Ian: Before I came to university, I didn't know how to write an essay. I'm in fourth year now. I'm writing essays. I think it's like anything – you don't know how to write a research report? Fair enough, but you're going to learn it by doing it more often and you get better at it.

Kate: All of our subjects are really well scaffolded. You can see where they follow on very well and if you started in first year introducing it and that thread then continues then by fourth year you could really get some research happening.

Note that in the light of the findings above which suggest that students do not view research assessment tasks as "real research," and the desire expressed by both focus groups to do some research activities as part of regular assessment tasks, it may be that many of the students who do not believe they should conduct an entire research project conceptualise an entire research project as being something equivalent to an honours-level thesis in which they are the sole investigator. In reporting about their research experiences, even those in each group who did not believe they had completed an entire research project nonetheless reported at various times conducting literature reviews, collecting data in groups or pairs, conducting analyses, and, in a small number of cases, writing reports based on their findings.

Students' perceptions of research as a function of their perceived research experience

Chi-square tests of association were employed to compare the perceptions of research of students with and without research experience (i.e. students' responses to the five "perceptions of research" survey questions to which students had been asked to respond on a Likert scale from strongly disagree to strongly agree). In this study, because there were instances in which an expected cell-count was below 1 (Elliott & Woodward, 2007), responses were combined to create three response categories: disagree or strongly disagree; neutral; and agree or strongly agree. In cases where expected frequencies remained below 5, Chi-square was replaced by the more conservative Fisher's exact test (Elliott & Woodward, 2007).

Table 4 reports the results of the analysis. Results show that students who believe they possess research experience differ significantly from students who believe they do not possess research experience in their responses to each of the five statements regarding the value of research. Compared to students who believe they do not possess research experience, students who do believe they possess research experience were more likely to agree or strongly agree that the university should encourage undergraduate engagement with research. They were also more likely to agree or strongly agree that all undergraduate education students should learn about research, that all undergraduate students should conduct at least part of a research project, and that all undergraduate students should conduct an entire research project. Conversely, compared to students claiming to possess research experience, students

Table 4.   Research experience and perceptions of research.

	N	χ^2	df	p
I don't really like research**	234	12.67	2	.002
The university should encourage undergraduate engagement with research**	234	13.12	2	.001
All undergraduate education students should learn about research**	234	18.15	2	.001[#]
All undergraduate students should conduct at least part of a research project**	234	20.06	2	.000[#]
All undergraduate students should conduct an entire research project**	233	10.49	2	.005

Notes: **Statistically significant at $\alpha = .05$.
[#]Since contingency tables contain at least one cell with an expected count of less than five, *p-values* were calculated using Fisher's exact test.

Table 5.   Attitudes towards postgraduate study.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I am interested in pursuing postgraduate studies in the field of education (*N* = 84)	5 (6%)	15 (18%)	23 (27%)	27 (32%)	14 (17%)
The research that I have conducted has made me more likely to consider postgraduate studies in the field of education (*N* = 84)	9 (11%)	15 (18%)	29 (34%)	22 (26%)	9 (11%)
The research that I have conducted has made me less likely to consider postgraduate studies in the field of education (*N* = 84)	18 (21%)	24 (29%)	29 (34%)	9 (11%)	4 (5%)

who believed they do not possess research experience were more likely to indicate that they do not like research.

The 85 students who believed they possessed research experience were asked to indicate their level of agreement or disagreement with the following statements: (i) "I am interested in pursuing postgraduate studies in the field of education"; (ii) "the research that I have conducted has made me more likely to consider postgraduate studies in the field of education"; and (iii) "the research that I have conducted has made me less likely to consider postgraduate studies in the field of education." Responses were received from all but one of the 85 students. Table 5 reports the results. Responses revealed a general positive attitude towards postgraduate study, with less than one quarter of respondents (24%) disagreeing with the statement that they are interested in pursuing postgraduate studies in education. A greater number of students agreed (37%) rather than disagreed (29%) with the statement that their research experience made them more likely to consider postgraduate studies in education. Finally, a greater number of students disagreed (50%) rather than agreed (16%) with the statement that their research experience made them less likely to consider postgraduate studies in education.

Students' perceptions of research as a function of their motivational style

Students were categorised as intrinsically or extrinsically motivated based on the extent to which they agreed or disagreed with a series of statements regarding their attitudes towards university studies. From the 234 respondents who responded to the motivation items in the online survey, 116 (49.57%) were categorised as extrinsically motivated, and 118 (50.43%) were categorised as intrinsically motivated.

Table 6 reveals the results of several chi-square tests of association comparing the research perceptions of both groups. It shows that the two groups differed significantly in how they responded to two of the five statements about research. Firstly, compared to students who were intrinsically motivated, students who were extrinsically motivated were more likely to state that they do not really like research. Secondly, compared to students who were extrinsically motivated, students who were intrinsically motivated were more likely to support the statement that all undergraduate education students should learn about research.

Table 6. Motivational style and perceptions of research.

	N	χ^2	df	p
I don't really like research**	234	17.27	2	.000
The university should encourage undergraduate engagement with research	234	3.26	2	.196
All undergraduate education students should learn about research**	234	6.58	2	.033[#]
All undergraduate students should conduct at least part of a research project	234	0.76	2	.684
All undergraduate students should conduct an entire research project	233	0.81	2	.667

Notes: **Statistically significant at $\alpha = .05$.
#Since two (33.3%) of the cells for this test contained expected counts of less than five, the *p*-value for this test was calculated using Fisher's exact test.

Qualitative responses from the survey revealed why some of the students categorised as extrinsically motivated did not consider research to be relevant for pre-service teachers. When asked "Do you think conducting educational research is of use for education students?", for example, students who had been classified as extrinsically motivated responded:

> I don't think so. It is best to focus on curriculum and teaching/classroom management techniques.

> No, I do not believe conducting educational research would be useful for education students ... I feel that students will not benefit from this as much as benefitting from something such as practical teaching experience as teaching is the ultimate goal of the majority of educational students, rather than being educational researchers.

> Not at undergraduate level, I think that students should be learning about how to teach, how to develop a session plan based on the curriculum, how to break the session plan up into lesson plans, to be able to cover the content that is required to be taught and to be able to do it successfully.

Discussion

In this study, we aimed to determine whether past research experience and pre-existing motivation style influence pre-service teachers' perceptions of research. We found that research engagement and perceptions of research depend, at least in part, on perceived research experience. Those who claimed to possess research experience were more likely to believe that the university should encourage undergraduate engagement with research and that all education students should learn about research. They were also more likely to believe that all students should conduct part of a research project, or an entire research project, during their undergraduate degree. Conversely, they were less likely to indicate that they dislike research. In addition, these perceptions of research appear to translate into plans for postgraduate study. A greater number of students agreed rather than disagreed that their research experience made them more likely to consider postgraduate study in the field of education. We also found evidence to suggest that engagement with research depends, in part, on motivation styles. Those who were intrinsically motivated with respect to their studies were more likely to believe that all undergraduate education students should learn about research, and were less likely to indicate that they dislike research.

That only one third of participants reported prior research experience might suggest that education academics do not view research activities as imperative in

preparing education students for a career in teaching. Alternatively, it is also possible that many academic staff have a broader definition of research than do students. Our focus group data support this latter possibility. For example, several focus group participants stated that they had completed assignments during which they had interviewed children and analysed their achievement attributions, meta-memory or strategies for solving mathematical problems. However, the majority of participants agreed that these projects were not "true research" because (i) they were not given the opportunity to define their own research topic; (ii) they were not allowed to expand upon prescribed interview questions; and/or (iii) the results did not contribute to the field. It is likely, then, that many survey respondents who stated that they do not possess research experience actually have conducted activities that most academics would consider to be research-based. This interpretation is consistent with Zamorski's (2002), who found that academics tend to conceptualise research more broadly than students, meaning they are more likely than students to believe that research should, and does, form a major part of the curriculum.

Our findings regarding research experience suggest that, despite the common fears or anxieties regarding research tasks that have been documented in the literature, there nonetheless may be merit in continuing to implement such tasks. Thus, educators should not feel discouraged initially. While tasks that are considered by the majority of students to be intrinsically unpleasant, stressful or onerous are likely to remain so irrespective of experience, we found that positive attitudes towards research were higher in those who *already had* research experience. While it is beyond the scope of our study to consider *when* such experiences should be implemented, we suggest that future research should also consider the timing of such experience.

Research-based learning is consistent with current models of learning, which assume that knowledge is something constructed by the learner rather than transmitted by the teacher (Brew, 2003). Indeed, it appears that pre-service teachers generally embrace the idea that knowledge changes and is sourced mainly from self-construction rather than from authority or expert figures (Cheng, Chan, Tang, & Cheng, 2009). A constructivist approach to learning suggests that all university students, not just those planning to complete higher degrees, should be exposed to systematic process of inquiry (Brew, 2003). Learning about research, however, is likely to prove difficult for many pre-service teachers: particularly during the latter stages of an undergraduate programme characterised by the survival concerns associated with professional experience placements (Ginns, Heidsfield, Atweh, & Watters, 2001). It may therefore be the case that research opportunities are most effective in changing students' attitudes when provided during the early stages of the undergraduate programme, before these survival concerns take hold.

Of course, some students may enjoy research more than others, regardless of their research experience. While students in our study generally expressed positive attitudes towards research, there was some evidence to suggest an association between motivational styles and attitudes towards research. Students who were classified as being intrinsically motivated were more likely to enjoy research. This finding is consistent with results from Breen and Lindsay (1999), who found that intrinsic motivation led students from a range of disciplines to want to learn about and conduct their own research. We extend Breen and Lindsay's (1999) results by focusing specifically on pre-service teachers.

The association between intrinsic motivation and research acceptance may stem from differences in how intrinsically and extrinsically motivated pre-service teachers perceive the role of a teacher in the classroom. While some pre-service teachers may believe that research is needed to ensure evidence-based practice, many others may view research as an unnecessary distraction from the core responsibilities of a teacher (Deemer, 2009). The manner in which pre-service teachers conceptualise the role of a teacher and evaluate educational research is likely to be shaped by their epistemological beliefs about teaching and learning (Magnusson, Krajcik, & Borko, 1999). For instance, research shows that many pre-service teachers believe all students are different and learn in different ways, and thus any research findings supporting one instructional method over another cannot possibly be generalised to other students or contexts (Joram, 2007). Some pre-service teachers, particularly those who are extrinsically motivated, may therefore require further explanation as to how research activities are, or can be, relevant to the practice of teaching. Efforts might also be required to better support students' understanding of key methodological research concepts such as validity and generalisability. Further studies could explore how motivational styles influence pre-service teachers' beliefs about what it means to be a teacher. On this note, Nolen et al. (2007) explore the dynamic process through which teaching identity and the motivation to learn evolve as a result of their experiences and challenges in teacher education programs and fieldwork.

One limitation of this study is that the respondents might not represent a truly random sample of education students. Students who possess a stronger interest in research may be more likely than other pre-service teachers to participate. While the online survey had a response rate of approximately 12%, the focus groups in particular would be more likely to attract those who are both favourably predisposed towards research and intrinsically motivated by tertiary study. It is possible that the sample of pre-service teachers would display more positive attitudes towards research, compared to the wider population of pre-service teachers. That we still found evidence that extrinsically motivated, and research-inexperienced, students found research uninspiring, then, is particularly interesting. Further studies might explore the components of the research experience students find most challenging or expect to find most challenging. Second, we note our focus on students' *perceptions* of research experience. We note that these perceptions may differ from those of academics. It would therefore be useful for future research to consider comparing and contrasting these differing sources of information on research experience and their impacts. Finally, and drawing on these findings, further studies should consider the types of support and guidance that the university can provide to more effectively promote educational research at the undergraduate level.

Conclusion

This study has shown that pre-service teachers generally display a positive attitude towards research, although these attitudes depend on their perceived research experience and also on their motivational styles. Students who are intrinsically motivated with respect to their studies are more likely, compared to students who are extrinsically motivated, to enjoy research and believe that all pre-service teachers should learn about research during their undergraduate degree. However, this study also shows that students who believe they possess research experience are more likely,

compared to students who believe they do not possess such experience, to value research and support the university's attempts to promote research at the under-graduate level. These findings suggest that one way to overcome students' reservations about research might be to actually provide them with research experience. Furthermore, greater efforts are needed to define research for students, highlighting what activities count as research and how such activities are relevant for development as a teacher. Further study is needed to ensure that any research opportunities that the university provides are designed in a manner that allows students to overcome their concerns and recognise the full benefits of research.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes

1. First year: yes = 8 (12.50%), no = 56 (87.50%); second year: yes = 11 (26.19%), no = 31 (73.81%); third year: yes = 18 (60.00%), no = 12 (40.00%); fourth year or beyond: yes = 27 (56.25%), no = 21 (43.75%).
2. Given that we select only those items relevant to intrinsic and extrinsic motivation, we do not intend these items to represent Breen and Lindsay's scale more fully. Nor should any psychometric properties of the full scale be assumed. Rather, we use these four items as one might use interview prompts, to enable a focus on intrinsic and extrinsic motivation only.

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