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A synthesis of the literature on research methods education

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The purpose of this research synthesis is to examine the current research on teaching and learning research methods. The aims are to understand the themes present in the current literature and identify gaps in our understanding of how we teach, and how students learn, research methods. A synthesis of 89 studies generated three themes: (1) characteristics of students taking a research methods course, (2) teaching methods and techniques, and (3) content and course goals. Gaps identified include a lack of research on assessment and on what and how students learn in research methods courses. The majority of studies reviewed were teacher reports of attempted teaching strategies so that an additional need exists for other types of research into the teaching and learning of research methods such as case studies of students' learning or experimental studies of assessment techniques. Suggestions for instructors and future research are considered.

Keywords: research methods instruction; research methods course; research training; research methodology

There are challenges faced by instructors of any university course, and introductory research methods courses are no exception. Research methods is considered by many to be a complex domain (Ball and Pelco 2006; Birbill, n.d.; Braguglia and Jackson 2012; Crooks, Castleden, and Van Meerveld 2010; Deem and Lucas 2006; Denham 1997; Lehti and Lehtinen 2005; Murtonen and Lehtinen 2005; Potter, Caffrey, and Plante 2003; Sachs 2002; Strangman and Knowles 2012; Winn 1995) that involves a combination of procedures and definitions, many of which Lehti and Lehtinen (2005) argue that the 'academic community itself has no uniform conception of' (218). Schutt, Blalock, and Wagenaar (1984 cited in Potter, Caffrey, and Plante 2003) remind us that research is a 'sustained task that involves a number of different kinds of activities that must be interrelated carefully and for which decisions made at one state of the process influence choices at later ones' (38). Research methods instructors must somehow demonstrate these interrelated tasks and complexities so that students new to the research process (and those not typically majoring in research methodology) can understand and ultimately apply them.

A second challenge we face is whether to focus on training consumers of research or producers of research, or both (Hardcastle and Bisman 2003; Onwuegbuzie, Slate, and Schwartz 2001). This in part reflects what Phillips and Russell (1994) described as 'the need to recognize individual differences among students in their abilities and desires to do

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research' (628–629). While each type of student requires similar content, the style of teaching and the form of assessment may vary based on this focus. Consumers of research will not typically go on to conduct research on their own but will pursue careers that rely on a fundamental knowledge of research in order to stay current (Rodriguez and Toews 2005). For example, many teachers will not go on to conduct basic research but should be able to read the research literature related to teaching and learning in their field. Producers of research, on the other hand, will go on to professions or graduate schools that require or at least encourage a certain amount of basic research as part of the job. These students will need a much deeper understanding of the *hows* of research that consumers of research may not need. And some may argue that both types of students require the same foundational research knowledge; introductory courses should, therefore, address both types equally with the same content and assessment.

Another challenge we face is 'research methods education', is not an established field of research like, for example, math education, nursing education, science education, or statistics education (Garner, Wagner, and Kawulich, 2009; Wagner, Garner, and Kawulich 2011). There are no scholarly journals devoted solely to teaching research methods; these sources are instead scattered across disciplines and journals (e.g. nursing [e.g. *Nurse Researcher*, Volume 13, Number 2, 2005], sociology [e.g. *Sociology*, Volume 15, Issue 4, November 1981], and education [e.g. *Scandinavian Journal of Educational Research*, Volume 49, Issue 1, July 2005]). And even though research methods courses are a staple in many undergraduate and graduate programs, teachers, as a part of their own graduate programs, rarely receive formal instruction in how to teach research methods (typical of many disciplines). Left to their own devices, research methods teachers must rely on a network of peers, scattered research literature, and much trial-and-error as they develop and improve upon their own research methods courses.

With these ideas in mind, I undertook the current research synthesis to explore what exactly we *do* know about the teaching and learning of research methods. The specific research questions addressed by this synthesis include the following:

- (1) What does the current literature tell us about teaching research methods?
- (2) What does the current literature tell us about the learning of research methods?
- (3) What gaps are there in the current literature related to teaching and learning research methods?
- (4) What suggestions for further research can be identified through an exploration of the current literature on teaching and learning research methods?

A similar review was presented in 2011 by Wagner, Garner, and Kawulich that generated seven themes related to the research methods literature:

- (1) Research methods teaching in general,
- (2) Teaching qualitative research methods,
- (3) Teaching quantitative research methods and statistics,
- (4) Teaching mixed methods,
- (5) Techniques for teaching research methods,
- (6) Teaching research methods for specific disciplines, and
- (7) Teaching ethics in research.

Their review covered 195 articles spanning the years 1997–2007. The current review differs in several ways: first, it hopes to dig deeper into the ‘techniques for teaching research methods’ and ‘research methods teaching in general’ themes presented by these authors; second, it will cover articles running up to 2012 as well as some pre-1997; and third, it will focus only on general research methods courses across disciplines rather than the set of articles that led to themes 2 through 4 above. Interestingly, there is not much overlap in the reference lists of these two reviews, although there is some.

Methods

I followed Cooper’s (1998) five stages for conducting a research synthesis. First is problem formulation, defining the problem and questions addressed by the synthesis. Next comes the literature search, identifying studies that fit the boundaries defined by the problem. Assessment of the quality and applicability of the studies is followed by analysis and interpretation, which is then followed by the final stage, presenting the results.

Problem formulation

The main purpose of this synthesis is to pull together the disparate literature related to the teaching and learning of research methods. For this synthesis, I defined ‘research methods course’ rather broadly, including courses in any discipline and at either the undergraduate or the graduate level. I included studies that discussed the general introductory research methods course. I left out courses discussing any specific family of research (e.g. those discussing teaching qualitative research or action research) and courses that were purely statistics courses with very little or no discussion of research methods. I was then rather inclusive in terms of the initial studies collected in that I included anything that had to do with a research methods course. The hope is to understand what the research is telling us about how to teach, and what to teach, in a general research methods course.

Studies collected

I located a total of 89 usable studies related to teaching and learning general research methods. These studies came from 21 fields (e.g. sociology, political science, business, psychology, education, and others) and spanned the years from 1987 to 2012 (note some studies pre-1987 were left out), for a total of 26 years of discussion in the literature, with a clear surge in the past 10 years. The studies came from a variety of countries including Australia, Canada, England, Finland, Greece, South Africa, Sweden, Taiwan, and the USA. There are very few conference papers included here, one limitation to the synthesis. By far the majority ($n = 48$) of studies represent teacher reflections and classroom research studies, followed by a fair number of quantitative studies ($n = 25$). I also found a few qualitative studies of teaching or learning ($n = 5$), three mixed methodology studies, one literature review, seven essays, and three books (Dunn, Smith, and Beins 2007; Garner, Wagner, and Kawulich 2009; Saville 2008).

Data evaluation

The data evaluation stage involves assessing the quality of the data retrieved, in this case, the quality and appropriateness of the articles found in relation to the overall purpose of describing the current literature related to the teaching and learning of research methods.

My evaluation involved a surface reading of each article to ensure that it did in fact discuss some aspect of teaching the course or of students learning in the course. Some case studies, of course, were left out at this stage, as they did not directly discuss teaching or learning but simply laid out the plan for a course with no evaluation or reflection on the author's part.

Data analysis

As there is a mixed bag of research types in this synthesis, traditional meta-analytic strategies (Cooper 1998) could not be used to analyze the articles. Instead, I undertook a qualitative analysis based on coding each article for key concepts and developing themes out of these codes. I first read each article to get a sense of the whole. What were the main ideas expressed in the introduction? What sort of study did the author(s) conduct? What were the results of this study? What do the author(s) have to say about teaching and/or learning research methods in their conclusions? I then went back through and read each article again coding significant points. I used the constant-comparative coding technique (Dye et al. 2000) so that as I identified new codes I returned to previously coded articles to see if I had missed those points and added codes to those earlier articles as appropriate.

Results

I generated three themes from the codes used during data analysis: (1) characteristics of students taking a research methods course, (2) teaching methods and techniques, and (3) content and/or goals of a research methods course.

Characteristics of students taking a research methods course

Fifty-one articles present, typically anecdotally, the following picture of introductory research methods students:

- (1) They *fail to see the relevance* of the course to their major and their lives (Braguglia and Jackson 2012; Briggs et al. 2009; Deem and Lucas 2006; Donham, Heinrich, and Bostwick 2010; Dorfman and Lipscomb 2005; Edwards and Thatcher 2004; Emery and Kalscheur 2000; Fabelo-Alcover 2002; Hardcastle and Bisman 2003; Keyton 2001; Moulding and Hadley 2010; Murtonen et al. 2008; Papanastasiou and Zembylas 2008; Poindexter 1997; Rodriguez and Toews 2005; Spronken-Smith 2005; Stacks and Hickson 1991; Vandiver and Walsh 2010; Winn 1995);
- (2) They are typically *anxious or nervous* about the course and its difficulty (Braguglia and Jackson 2012; Briggs et al. 2009; Denham 1997; Diab 2006; Dilevko 2000; Emery and Kalscheur 2000; Fabelo-Alcover 2002; Hamilton, n.d.; Papanastasiou and Zembylas 2008; Trimarco 1997; Vandiver and Walsh 2010; Van Eeden-Moorefield and Walsh 2010);
- (3) They are *uninterested and, therefore, unmotivated* to learn the material (Aguado 2009; Ball and Palco 2006; Birbill, n.d.; Barraket 2005; Braguglia and Jackson 2012; Briggs et al. 2009; Burkley and Burkley 2009; Campisi and Finn 2011; Fabelo-Alcover 2002; Lehti and Lehtinen 2005; Lie and Cano 2001; Pietersen 2002; Rash 2005; Vittengl et al. 2004);

- (4) They come to the course with *poor attitudes toward research* (Hardcastle and Bisman 2003; Whitmeyer Hitchcock and Murphy 1999; Lei 2008, 2010; Montcalm 1999; Onwuegbuzie, Slate, and Schwartz 2001; Ozturk 2011; Papanastasiou 2005; Schulze 2009; Sizemore and Lewandowski 2009; Stacks and Hickson 1991); and
- (5) They come to the course with *misconceptions about research* (Deem and Lucas 2006; Fabelo-Alcover 2002; Meyer, Shanahan, and Laugksch 2005; Meyer, 2007; Meyer, Shanahan, and Laugksch, 2007; Murtonen 1999; Murtonen and Lehtinen 2005; Zablotzky 2001).

Interestingly, there is no clear attribution of these negative characteristics – that is, we do not know *why* students are not receptive to the course. Have they heard from their peers about difficulties with the course, or are they basing these negative emotions on a lay understanding of ‘research’ and what it entails? Or have they taken a course in which research was discussed and so they have applied their feelings about that course to this one? Further, no articles discuss the achievement of students given this rather negative characterization, although authors do agree that these attitudes and views ‘hinder learning’ (Lehti and Lehtinen 2005; Lie and Cano 2001; Murtonen and Lehtinen 2005; Papanastasiou 2005; Poindexter 1997; Vandiver and Walsh 2010). Sizemore and Lewandowski (2009) did find an increase in student knowledge after taking a research methods course, but no concomitant increase in attitude was found. Most of these characterizations are anecdotal, but authors have introduced measures such as the *Attitude toward Research* scale (Papanastasiou 2005), the *Educators’ Attitudes toward Educational Research* scale (Ozturk 2011), and the *Student Conceptions of Research Inventory* (Meyer, Shanahan, and Laugksch 2005, 2007) in an attempt to more directly quantify these student characteristics.

Teaching methods and techniques

As a result of these negative student characteristics, 38 of the articles reviewed discuss teaching techniques meant to increase relevance, interest, and attitude, including the following:

- *Active learning* (Benson and Blackman 2003; Campisi and Finn 2011; DeWitt 2010; Marek, Christopher, and Walker 2004; Polkinghorne and Wilton 2010; Vandiver and Walsh 2010; Walsh and Vandiver, n.d.; Williams 2007),
- *Problem-based learning* (Braguglia and Jackson 2012; Greenwald 2006; Lehti and Lehtinen 2005; McBurney 1995; Spronken-Smith 2005),
- *Cooperative learning* (Ball and Pelco 2006; DaRos-Voseles et al. 2008; Jiao et al. 2011; Onwuegbuzie 2001; Onwuegbuzie, Collins, and Elbedour 2003; Onwuegbuzie, Collins, and Jiao 2009; Onwuegbuzie and DaRos-Vaseles 2001),
- *Service learning* (learning in the context of community service work completed alongside traditional classroom work) (Keyton 2001; Potter, Caffrey, and Plante 2003; Rash 2005),
- *‘Learning by doing’ or general experiential learning* (Aguado 2009; Birbill, n.d.; Whitmeyer Hitchcock, and Murphy 1999; Longmore, Dunn, and Jarboe 1996; Singleton 2007; Strangman and Knowles 2012; Takata and Leiting 1987; Winn 1995).

- Some authors also discuss *online learning* modules (Campbell et al. 2008; Chen and Tsai 2009; Girod and Wojcikiewicz 2009; Hisle-Gorman and Zuravin 2006; Lie and Cano 2001; Lim, Dannels, and Watkins 2008; Schulze 2009).

As far back as 1975, research methods instructors have recognized that ‘being able to do research is a skill consisting of both knowledge and practical decision-making competence’ (Wieting 1975). In 2011, we still hear from instructors who find that ‘the aim is to engage students directly in research activity’ (Wagner, Garner, and Kawulich 2011). To that end, authors that led to this teaching techniques theme integrated some sort of research project into the course, either as an individual or group project. Onwuegbuzie and colleagues evaluated cooperative learning groups on a variety of outcome assessments, including article critiques (also used by Bachiochi et al. 2011), proposals, and content knowledge. Most of these authors present in-depth discussions of the course and/or project involved along with instructor and student feedback regarding the process, if any evaluation is presented at all. Some of the articles report descriptions of the course/project without any evaluation.

Content and/or goals of the research methods course

Few articles present any sort of discussion of the actual content or goals of a research methods course, a noticeable gap [echoed in Wagner, Garner, and Kawulich (2011)] in the literature reviewed. There are implied learning objectives, or overarching learning goals, in most articles, but none explore specific learning objectives and their impact on the teaching and learning of research methods. Aguado (2009) mentions that the goal of his course in political science is ‘to communicate the research process’ – this is a typical implicit goal in many of the studies that discuss experiential learning techniques described earlier. He goes on to discuss other more specific goals for his political science research methods course. As discussed earlier, Ball and Pelco (2006) distinguish between training producers and consumers of research (as does Diab 2006). Hardcastle and Bisman (2003) indicate this distinction leads to two of three models of research methods instruction: the ‘educated consumer of research model’ and the ‘practitioner scientist model’ (32), respectively, although how teaching and learning differs based on these characterizations remains uninvestigated.

For Barraket (2005) and others, ‘the primary learning objectives ... are to develop students’ critical and reflective thinking about and practical skills in designing, implementing, or managing empirical research’ (67). Lei (2010) begins with, ‘The purpose of an introductory research methodology course is for students to become familiar with research mainly at “how-to” skills and application level’ (236). He goes on to describe general course design principles which include focusing on both the cognitive domain of learning and the affective domain (e.g. students’ ‘research interest, appreciation, course value, and attitude toward research’ [238]). Denham (1997) lists four goals for teaching that include ‘why and how research is conducted ... [and] provid[ing] students with an ability to evaluate critically the research he or she contacts’ (55) but then goes on to suggest, ‘some have questioned whether there is a right answer with regard to the content of undergraduate courses in research methods’ (56).

Bachiochi et al. (2011) used the article critique as a final course assessment to align with the second goal of the American Psychological Association (APA) regarding ‘research methods in psychology’ (6). Specifically, this final assessment allowed them to

uncover student knowledge of variables, generalizability, and ethics. This assessment did demonstrate to the authors the gains in student knowledge from pre- to post-test. Aguado (2009) also mentions similar specific content for his students, including data-gathering, analysis, and 'learning the language' of research (252) but provides no analysis of any student knowledge or gains as part of his reflections.

Discussion

Implications for teachers

One implication of this review for teachers is to be aware that students are not necessarily coming into the course with positive emotions, attitudes, conceptions, or views regarding research methods. The main lesson to be learned from the current literature on teaching and learning research methods is teachers need to use active learning approaches to teaching the course in a way that provides hands-on exposure to research methods. No distinction was made between whether this works better for 'consumers' or 'producers' of research, so the assumption is the active learning approach works for all students equally well. This assumption needs to be tested by further research. This approach is one way to address the high levels of anxiety and the low opinion students have of the relevance of the material. For most of the articles in this synthesis, this meant students completing, either in part or in full, an actual research study – some in the context of service learning. Other student-centered approaches discussed in the literature include cooperative and problem-based learning strategies. The research proposal came up often as a means of assessing student knowledge of research methods, along with some mention of students completing article critiques.

Very little was presented that gives us a picture of what student learning looks like. While some articles discussed course content, and others assessment, none presented a picture of student knowledge gained as a result of taking a research methods course – we do not know, for example, what students know after taking a research methods course that they did not know before. Were students aware of the research cycle prior to the course? If so, did they learn anything new in the research methods course? We have some better picture of *how* students learn – again, this is best accomplished through *doing research* as opposed to just talking about it. Yet we do not know what specific course knowledge is best assessed via 'doing', and if there is some knowledge better left to more traditional forms of assessment such as tests and quizzes. For example, should the distinction between independent and dependent variables be assessed via a traditional exam or can it be assessed through the proposal writing process? Again, the 'consumer' vs. 'producer' dichotomy is important here – are there different learning goals attached to each type of learner or should they learn the same material regardless? This is another area for further research.

Implications for further research

I have identified at least three major gaps in the literature reviewed for future research methods education researchers to pursue:

- (1) There was very little discussion of what students actually learn in a research methods course, except for some anecdotal evidence that project-based learning

- ‘allows students to develop an understanding of the process of doing research’ (e.g. Winn 1995, para. 33);
- (2) There was no discussion of how we assess students in a research methods course beyond indications that final projects were used in these courses (these projects were discussed in terms of alleviating students’ negative characteristics, not in terms of the assessment of any specific learning objectives); and
 - (3) As a precursor to (1) and (2), there is very little discussion of what the learning objectives of an introductory research methods course should be. Without these, assessing what students have learned becomes difficult.
 - (4) Incorporating whether a student is more on the ‘consumer’ side of the spectrum or more on the ‘producer’ side into future studies may also tease out some important differences between these students – do they have different attitudes toward research, for example?

Moving the pedagogy of research methods forward requires work in each of these areas so we have a greater understanding of what we want our students to learn and what they actually learn. This is also important as it relates to teaching techniques – are we advocating teaching methods that are actually impacting student understandings of and attitudes toward research? What exactly is it we want these understanding and attitudes to look like after an introductory general research methods course?

One of the most interesting aspects of this review is the fact that research methods education is being discussed in many fields – from psychology and sociology to theological education and business – in many countries at both the undergraduate and graduate level. Clearly, there is a need for this sort of research to continue. The benefits of discussing who we teach, how we teach and assess, and what content we teach in these courses has far-reaching consequences for improving the educational experience of countless students.

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