Journal of the Scholarship of Teaching and Learning, Vol. 10, No. 2, June 2010, pp. 60 – 77.

Teaching research to teachers: A self-study of course design, student outcomes, and instructor learning

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Abstract: This description of a teaching self-study focuses on a graduate research course for classroom teachers in which two issues central to improving teaching practice were addressed. First, it details the process of examining course design and curriculum in search of the most effective strategies for training classroom teachers to do research. Second, it explores what can be learned about the teaching process by methodically examining student feedback, course outcomes, and instructor learning during three course iterations. The results of the study include a description of the teacher-as-researcher course design, a summary of student feedback and outcomes, and a report of instructor learning that grew out of engaging in the self-study process.

Keywords: action research, self-study, reflective practice, adult development, qualitative methodologies.

What methods are most useful in training classroom teachers to engage in action research? Two years ago, I was assigned to design and teach a graduate-level practitioner research course. I found this assignment to be exciting but somewhat intimidating. In designing the course, my plan was to discover and incorporate "best practice" for training teacher-scholars to access and understand academic research. Other key aims of the course were to empower students by teaching core research skills that could be applied in their own educational settings (Parsons and Brown, 2002), to model the scholarship of teaching by using action research and reflection in my own classroom (Mertler and Charles, 2005), and to share study outcomes with professional colleagues. Since classroom research has recently moved to the forefront of potential strategies for school improvement (Darling-Hammond, 1999; Savoie-Zajc, L., and Deschamps-Bednarz, N.; 2007), I felt the full weight of my instructional responsibility.

The constructivist design that evolved during the course of the study is grounded in sociocultural adult learning theory (Vygotsky, 1997). Self-study frameworks (Kosnik, Beck, Freese, and Samaras, 2006) were used to inform reflective instructor inquiry. Student outcomes were reviewed using qualitative research methods (Coffey and Atkinson, 1996) to address the following research questions:

- Course Design: What course design and teaching/learning strategies are effective in training teacher researchers?
- Instructor Learning: What patterns of instructor learning emerge from a methodical examination of instructor inquiry, reflection, and student feedback in a self-study of a teacher-as-researcher course?
- Student Outcomes: What patterns/understandings will emerge from a methodical examination of student products and reflections during a self-study of a teacher-as-researcher course?

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I. Literature Review.

To inform the design of this course, relevant literature was reviewed. Though related studies were useful, (Hughes, 2006; Johnston, Bendau, and Covert, 2003; Radencich, 1998), locating a step-by-step model for teaching research to teachers proved to be difficult. Instead, the search for knowledge about best teaching practices and optimal course design in the training of teacher researchers led to a review of literature in the areas of adult development (Kohlberg, 1969; Levinson, 1979; Sheehy, 1995; Trotter, 2006), professional development (Zech, Gause-Vega, Bray, Secules, and Goldman, 2000; Hansman, 2001; Stark, 2006), and action research methodology (Gray and Campbell-Evans, 2003; Mertler, 2006) during the initial design phase of the course.

Questions about how to study the teaching/learning process in which my students and I were engaged required additional literature review in research methodologies, including self-study (Samaras and Freese, 2006), reflective practice (Cole and Knowles, 1998, 2000), qualitative analysis (Bogdan and Biklen, 1998; Coffey and Atkinson, 1996), and meaning making from experience (Lather, 1991). My constructivist assumption (Lincoln and Guba, 1985) that as learners, we would collectively construct our unique learning experience together also shaped this study.

A. Adult Development and Learning.

A review of current theories of adult development and learning informed the initial structure and assignment design for the course (Hayes and Flannery, 2000; Kohlberg, 1969; Levinson, 1979; Sheehy, 1995; Trotter, 2006). This literature validated the importance of interactive learning activities and acknowledged the importance of the social construction of knowledge (Vygotsky, 1997). Cognitive functional theory (Brundage and Mackeracker, 1980; Daloz, 1986; Smith, 1982) suggested the incorporation of open-ended project design and inquiry-based process (Valli, VanZee, Rennert-Ariev, Mikeska, Catlett-Muhammad, and Roy, 2006). Research also supported student creation of final projects that were doable, but challenging enough to push them out of their current comfort zone (Kegan, 1982; Vygotsky, 1997). Teaching priorities and course direction also relied on components of real-life experience (Lather, 1991) and personal meaning making (Schwandt, 1994).

B. Self-Study Framework.

To understand the collective learning process in which my students and I were engaged, during the first semester of the course I began to observe, document, and reflect on our ongoing experience (Glesne, 1999). The self-study literature provided a framework for this documentation of our collective learning process. In *Self-study of Teaching Practices* (2006), Samaras and Freese write, "Self-study researchers continuously examine their practice and are committed to practice what they preach" (p. 33). Their framework outlines three purposes: "first, personal renewal (e.g. Freese, 2006; Feldman, 2006); second, professional renewal (e.g. Ham and Davey, 2006; Mitchell, 2006); and third, program renewal (e.g., McVarish and Rust, 2006; Kosnik and Beck, 2006)" (p. 14).

II. Methodology.

This self-study was informed by five central characteristics summarized by Samaras and Freese (2006) in *Self-Study of Teaching* Practices: self-study involves elements of situated inquiry, is an ongoing process, produces knowledge, and is informed by multiple theoretical views and methodologies. Self-study is also dualistic and paradoxical in nature and involves the individual and the collective, the personal and interpersonal, and the public and private.

A. Situated Inquiry.

The study began with personal inquiry and was motivated by questions from my unique context. The inquiry was self-initiated and drew upon my authority as a practitioner (Pinnegar cited in Samaras and Freese, 2006, p. 40). The self-study framework positioned me as an inquirer and a learner, enabling me to answer questions about my practice. It also enabled me to improve my own teaching (Bollough and Pinnegar cited in Samaras and Freese, 2006, p. 42).

B. Process and Knowledge.

By engaging in this self-study, I initiated a process of growth. I also began "a change journey in a hermeneutic spiral of questioning, discovery, challenge, hope and change" (Samaras and Freese, 2006, p. 43) for the purpose of developing knowledge about my own teaching.

C. Multiple Theoretical Stances and Methods.

Self-study scholarship utilizes multiple theoretical views and stances. Self-study also utilizes "multiple and diverse qualitative methods" (Samaras, Hicks, and Berger cited in Samaras and Freese, 2006, p. 47). It is rooted in a postmodern perspective and is by nature nonlinear (Wilcox, Watson, and Paterson cited in Samaras and Freese, 2006, p. 47). Multiple views and methodologies that informed various components of this study included inquiry (Glesne, 1999; Samaras and Freese, 2006), adult development (Trotter, 2006; Vygotsky, 1997), action research (Mertler, 2006), and qualitative methodologies (Lichtman, 2006).

D. Data Collection.

Hoban (2004) discusses the importance of data in the self-study process. In this self-study, data was collected and analyzed in three categories: Effectiveness of Course Design, Student Outcomes, and Instructor Learning. The types of data analyzed in this study are summarized below.

E. Study Participants.

The data-gathering for the study occurred over three course iterations. During that time, there were a total of 42 classroom teachers enrolled in the *Teacher as Researcher* course. Study participants included 14 men and 28 women, ranging in age from 25–52, with individual classroom experience ranging from 2 to 26 years. As the self-study researcher, my experience

includes 25 years in rural, urban, and suburban settings as teacher and administrator, a PhD in Educational Leadership, and five years of teaching at the university level.

Figure 1. Multiple data collection strands.

F. Methodology and Data Collection in Course Design Strand.

Course syllabi, assignments, and other instructor-designed materials were analyzed using document analysis methods (Freebody, 2003; Hodder, 1994). During the first semester, course design elements were informed by the review of literature and the instructor's experience (Lather, 1991). Instructor reflection and student feedback informed ongoing course changes and refinements throughout the three semesters of the study. The course syllabi, course calendar, course assignments, and rubrics were examined for connections to existing literature. A self-study framework (Kosnik, Beck, Freese, and Samaras, 2006), reflection (Cole and Knowles, 1998), and meaning making (Schwandt, 1994) were used as to examine initial course design and to shape ongoing instructor decision-making as the course evolved.

G. Methodology and Data Collection in Student Outcomes Strand.

Student products including article reviews, literature reviews, and research proposals were examined using course rubrics as quality measures of student understanding during the three-semester duration of the study. A pre/post student survey was used as a measure of prior research experience and to document shifts in student attitudes concerning research comfort levels as the course proceeded. Student reflections and final course commentaries were reviewed and emerging themes were identified using open thematic coding procedures (Coffey and Atkinson, 1996; Freebody, 2003).

H. Methodology and Data Collection in Instructor Learning Strand.

Reflective teaching notes were used to document instructor thinking and decision-making during the developmental phase of the course (Richardson, 1994). During the three semesters of the self-study, instructor observations and reflections, course evaluations, and student reflections were reviewed using thematic coding procedures. Emerging themes and patterns were identified and described. Concept maps (Samaras, 2002) were also used to summarize patterns found during the content analysis of study documents.

III. Study Outcomes.

A. Course Design Themes.

The five teaching-learning components that emerged as most relevant and useful in the design of this course are summarized in Figure 2.

Figure 2. Course design themes.

B. Research Immersion.

The understanding that immersion in authentic literature is a key component for developing teacher researchers was originally drawn from my previous immersion in formal research literature as a doctoral student. The importance of research immersion was corroborated in this study through content analyses of instructor reflections and student feedback documents. Following is an example of a typical student feedback statement on the value of this strategy:

> I especially liked the way you had us plunge right into reading research. You did it with a lot of guidance and support that really made it a lot less intimidating . . . after reading the first few articles . . . I actually found myself enjoying the process. (J. A.)

The use of authentic immersion strategies began on the first day of class with an assignment to retrieve a refereed journal article after a training session by a campus research librarian. Additional assignments to retrieve refereed journal articles continued throughout the semester. Information gleaned from these articles was used to develop the literature review sections of the research proposals.

C. Research Literacy.

Student pre-survey feedback revealed that a majority of course members were unfamiliar with research terms and statistical symbols. Because of this unfamiliarity, students struggled to understand the language, symbols, and tables they encountered in research studies. Teaching basic vocabulary, comprehension (Hattie, Biggs, and Purdie, 1996), and structural analysis helped students develop research literacy. Once students were familiar with research terms and format, they became adept at identifying key components of research studies as they worked in collaborative learning groups (McDevitt and Ormrod, 2007; Rosenshine and Meister, 1992).

> This course helped tremendously in allowing me to competently present . . . to the school board. Just using such terms such as: citations and quantitative and qualitative, added significance to our presentation. Also, the data collection and analysis required for grants is less mind-boggling and more meaningful now that I understand such terms as range and standard deviation. (L. K.)

D. Authentic Process of Research Design.

A professor who had a positive impact on me taught me the importance of asking compelling research questions that inform my own practice. This understanding shaped my work with teacher researchers. As we ventured into research design, I asked students to select an area of

personal interest or an engaging classroom problem to solve. These questions proved highly motivating as students designed research proposals.

E. Research Concepts Taught.

To equip students with basic tools for research design, the course provided a foundation in qualitative and quantitative research processes, formulation of research questions, research design, data-gathering instrument design, and data analysis. Critical connections were made as students found illustrative examples of these principles in the research articles they collected for their literature reviews. A strand of the course also reviewed basic statistical principles with a strong focus on understanding *how* and *why* a process was used in the research design, and less focus on computation of statistical formulae. One student commented,

> The idea that I could conduct action research in my classroom without the dryness and non-personal involvement of traditional research was very enlightening. Another treasure trove was the huge data base of research articles and the concept of peer reviews. (L. K.)

F. Incremental Learning: Baby Steps.

One of the major obstacles that emerged in the design of this course was the issue of student aversion to and fear surrounding research and data-gathering processes. And, since this was a required master's course, students with a wide variety of backgrounds and discipline-area strengths were represented in the group. Because the majority of students had limited experience with research, course assignments were carefully scaffolded (Rosenshine and Meister, 1992; Vygotsky, 1997) using small, incremental steps. Group work, individualized research projects, and extensive instructor feedback helped address the diversity of learning needs. Student feedback supported the importance of scaffolding the assignments. One student commented, "Doing the proposal in 'Baby Steps', made it much easier to digest. Each individual assignment was a means to our end goal . . . therefore I was invested in each assignment." (R. D.)

Table 1. Incremental course steps.

1. Immersion in the Literature: Retrieval of 10+ research articles across the semester.
2. Identification of Research Interest Area: Exercise designed to narrow research interests.
3. Formal Literature Review: Summarizing 10+ research articles.
4. Article Reviews (2): Exercise designed to help students identify standard research format and evaluate validity and reliability of articles retrieved.
5. Research Literacy Activities: How to speak "Statistics," scanning "p" and "t" tables, etc.
6. Ongoing Reflection Topics: (1) Research Comfort Level, (2) Research Question, (3) Observation, (4) Research Design, (5) Data-Gathering Instruments, (6) Final Learning.
7. Research Proposal: Culminating Project.

G. Teacher and Student Reflection.

Because this course utilized distance technology, students were geographically separated from their colleagues and instructor. This lack of face-to-face contact necessitated the creation of a

teaching strategy to facilitate in-depth feedback as students completed their proposals. Personal inquiry and student feedback shaped the design of a series of short reflections that incrementally guided students through the research process. Reflections one to two pages in length were assigned on the following topics: Research Comfort Level, Research Question Design, Observation, Research Design, Data-Gathering Instruments, and Final Learning (See Table 1, #6). Students reported that the reflections served as useful puzzle pieces for them as they assembled their final proposals.

IV. Student Outcomes.

A. Student Survey.

During the first semester I taught this course, I was surprised by the initial level of student aversion to research, but I was pleased to note a shift in student attitude toward research by the end of the course. To better understand the nature of the observed shift, I designed a Pre/Post Research Attitudes Survey. Using the instrument below, students were asked to rate themselves on a 3-point scale, indicating low, medium, or high comfort levels with research terms and processes at the beginning and at the end of the course.

Classroom teachers enrolled in the course ranged in teaching experience (two to more than twenty-five years), teaching discipline, and institutional assignment. The pre/post survey helped me determine in addition which students possessed a background in statistics, or had previously conducted research. Students with research backgrounds were encouraged to share their knowledge in collegial discussions with their peers and to provide assistance or support of colleagues during proposal development where appropriate. Table 2 illustrates the pre/post survey used for this course.

Table 2. Pre/post survey.

Questions:	**Strongly Agree 1**	**Agree 2**	**Disagree 3**
1. I am comfortable working with statistics.			
2. I have previously designed and/or conducted a research project.			
3. I am familiar with the process of action research.			
4. I have previously conducted action research.			
5. I conduct action research in my classroom.			
6. I have previously designed a research survey.			
7. I read the research literature in my field.			
8. I do Internet research in my field.			
9. I have specific ideas about how I'd like to improve my educational practice.			
10. These terms are familiar to me: chi square, two-tailed t test, qualitative research.			
11. I am familiar with APA format.			
12. I presently have the skills necessary to conduct educational research.			
13. I looked forward to taking this class.			
14. I know how to write a research proposal.			
15. I have used observation to gather information about my educational practice.			

16. I enjoy conducting research.			
17. I enjoy doing statistical analysis.			
18. I enjoy completing research proposals.			
19. I frequently reflect on my educational practice.			
20. I have previously gathered data to answer a research question.			

Student survey outcomes for the Spring 2009 semester are summarized below. They indicate an overall shift from a medium to low level of research comfort (41.06 out of a maximum high of 60.00), to medium to high level of research comfort (28.86 out of the optimum low of 20). Overall, students averaged a one level shift toward research comfort in 12.2 indicators out of 20. Similar shifts occurred during the additional semesters of the study, with an average of 13.3 shifts per student during the Summer 2009 semester, and 11.9 shifts per student during the Fall 2009 semester. The average number of incremental shifts per student during the three-semester self-study was 12.4 one level shifts toward research comfort out of 20 indicators.

Table 3. Sample student survey summary, Spring 2009.

Student:	**Pre-survey**	**Post-survey**	**Change Score: Incremental Shifts (1 to 2, 2 to 3 on a 20 question survey)**
A	45	23	22
B	40	35	5
C	42	35	7
D	38	29	9
E	43	28	15
F	49	32	17
G	25	26	-1
H	43	27	16
I	39	29	10
J	28	20	8
K	43	25	18
L	46	27	19
M	32	28	4
N	53	36	17
O	50	33	17
Class Average	41.06 (out of 60 max) Indicates a medium high "pre" level of research discomfort	28.86 (ideal score of 20) Indicates a medium low "post" level of research discomfort	12.2 Changes per student on a scale of 20 questions

B. Student Reflection Themes.

The assignment of six short reflections and one final overview reflection during the course greatly informed my teaching. Student reflections provided useful feedback on individual student progress and understanding. They also provided me with ongoing feedback which allowed me to better shape the course to fit student needs. Final course reflections completed by the forty-two study participants were reviewed and coded as an overall measure of effective course strategies and student outcomes. The top five most useful course outcomes identified by the students

during the three-semester study were skill in implementing action research processes, the usefulness of a scaffolded assignment structure, better connections between research and practice, professional empowerment, and the importance of a supportive learning environment.

Figure 3: Student reflection themes.

I also found the review of individual reflective comments to be useful in refining and motivating my teaching practice. One student wrote,

> I know this [course] will help me immensely, not only in my classroom, but in other facets of my professional life . . . the natural curiosity piqued by the myriad possible questions to be answered through action research makes me want to be a better teacher by knowing my students better by gathering data to help them. (N. J)

V. Instructor Reflection and Learning.

Teaching research to teachers was a powerful professional learning experience. The following graphic represents critical instructor learning themes that emerged from this self-study.

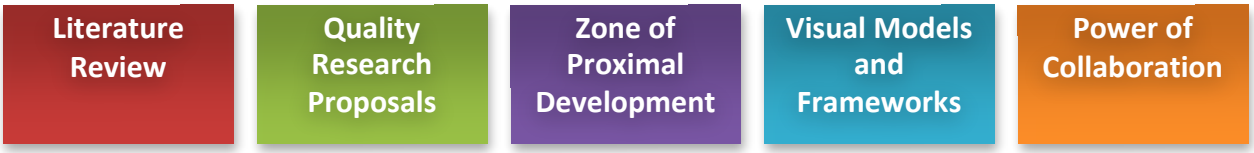

Figure 4. Instructor learning themes.

A. Literature Review is Critical.

Requiring students to conduct formal literature reviews was a key course requirement that extended student knowledge in their fields of interest and built research literacy skills. Training by an on-campus librarian helped provide students with basic search skills. But the most powerful learning took place as students searched the literature to answer their own research questions. During the semester, I conducted mini training sessions on how to negotiate relevant databases, identify key researchers in their fields of interest, judge the quality of a research article, and summarize their findings. Students responded positively to this training.

> I found it amazing when completing my literature review that there was already so much official research conducted in each area. It gave me some great ideas on different ways to conduct the research in my classroom and also strategies to use during my teaching in the classroom. By completing the literature review, it made me much more aware of the information that is available to teachers that can be very beneficial to our students. (A.P.)

B. Quality Research Proposals.

Using course rubrics as a quality measure, 100% of the students taking the course met proposal requirements and 70% of the students exceeded proposal requirements. The rubric in table 4 illustrates grading criteria for course research proposals.

Table 4. Proposal scoring rubric.

	Not Met	Partially Met	Met	Points Possible	Points Earned
Cover Page: In APA Format	Two or more criteria for APA format are missing	One criterion for APA format is missing	Cover page is formatted and complete	5	
Introduction	Introduction is missing two or more subheadings, and/or discussion is incomplete.	Introduction is missing one subheading, and/or is partially incomplete.	Introduction includes all subheadings, is well-written and complete.	20	
Review of Related Literature (10+ sources)	Review is missing 3 or more sources. Discussion is incomplete.	Review is missing 1 or more sources. Discussion is partially complete.	Review includes 6+ sources. Discussion is well-written and complete.	30	
Proposed Data Collection/ Methodology	Proposed Data Collection/ Methodology is incomplete.	Proposed Data Collection/ Methodology is partially complete.	Data Collection/ Methodology is logical and complete.	25	
Proposed Data Analysis	Data Collection/ Proposed Data Analysis description is insubstantial.	Data Collection/ Proposed Data Analysis description is fairly substantial.	Data Collection/ Proposed Data Analysis is logical and substantial.	25	
Reflection	Reflection is insubstantial.	Reflection is fairly substantial.	Reflection is well-written and substantial.	30	
References	6 or less Journal References	6–10 Journal References	10+Refereed Journal References	15	
Format/Writing Conventions	APA Format/Writing Conventions are significantly below expectations.	Format/Writing Conventions are below expectations.	Format/Writing Conventions are at or above expected level.	15	
Total:				165	

C. Zone of Proximal Development.

Teaching in the Zone of Proximal Development (Vygotsky, 1997), that difficult, itchy place where students are challenged but not overwhelmed, was a strategy students responded positively to. Although course work load was heavy, and proposal development was challenging, students frequently expressed "aha" excitement after completing their literature reviews and their formal proposals.

> It was the "roll up your sleeves and wipe the sweat off your brow" type of dirty work that was forced upon me through countless hours of researching and looking at abstracts and articles that really made me understand what I was looking for in evaluating what I was finding. (L. L.)

D. Visual Models and Frameworks.

During the course of the study, I found that students understood complex ideas more easily when those ideas were reduced to a framework, concept map, or graphic. Students reported that the simple graphic below was a powerful tool in clarifying the design of their proposed research. I also found concept maps and graphics to be useful in reporting study outcomes (Samaras, 2002).

(1) What is your research question?	(2) What information do you need to answer it?
(3) How will you analyze this information?	(4) What is your expected outcome?

E. Collaboration.

Theoretical frameworks of sociocultural and adult development theory (McDevitt and Ormrod, 2005; Vygotsky, 1997) suggested learning experiences in this course that included frequent interaction and processing in small groups (Glickman, Gordon, and Ross-Gordon, 2009; Hansman, 2001). Student feedback positively reinforced the usefulness of collaborative learning in this:

> At our site, we would discuss what we were looking up and we would share information and things we had come across in our searching. I liked that collaboration and help.
> (D. H.)

VI. Discussion.

A. Course Design Implications.

This study suggests that immersion in authentic research literature, teaching frameworks of formal research design, the scaffolding of assignments, and short, frequent, interactive reflections are useful elements of course design in the training of teacher researchers. A three-semester review of course design and course outcomes of a teacher-as-researcher course provided contextual examples of classroom teachers who could successfully access, read, and review formal refereed journal articles. The successful completion of quality research proposals by course participants demonstrates that with precise training, classroom teachers can design research for their individual organizational settings.

B. Student Feedback Implications.

Student feedback identified the following themes/strategies as useful outcomes of the course: increased skill in and interest in implementing action research in their settings, the usefulness of scaffolded assignment structure, stronger connections between their practice and current

research, feelings of professional empowerment, and increased understanding of the importance of a supportive learning environment. An instructor-designed survey conducted during three course semesters provided contextual evidence that teacher attitudes and fears about research can shift in a positive direction through the use of effective course design and incremental, supportive teaching/learning processes.

C. Instructor Learning Implications.

The study identified the following teaching strategies as useful in the teaching of research skills: completing a literature review, assigning short, scaffolded reflections, working in the Zone of Proximal Development (Vygotsky, 1997), recognizing different levels of student readiness, and working collaboratively.

D. Usefulness of Self-Study Methodology.

Analyzing data and documenting my own teaching practice reinforced the importance of instructor self-study as a tool for personal and professional renewal and for the improvement of teaching practice (Samaras and Freese, 2006). Focused inquiry strengthened my ability to understand student needs and design strategies to teach specific skills. Reasoned, thoughtful, inquiry, a review of related literature, and analysis of course documents, student products, reflections, and feedback yielded useful information that shaped and improved successive lessons and courses. During this study, my teaching reflections became more specific and informative, moving me more deeply into the cycle of improvement. As an instructor, I found self-study to be a useful tool in renewing teaching practice and refining course design.

E. Course Design Refinements.

Course refinements made during this period as a result of self-study include the addition of five short chapters from a statistics text (Salkind, 2008); reviewing statistical basics: measures of central tendency, correlation coefficients, and validity, reliability, and probability; the addition of a training session in research retrieval by an on-campus librarian; an increased number of interactive learning discussions with each successive semester; the elimination of a text; and the elimination of one case study from the final.

F. Unexpected Outcomes.

An unexpected course outcome was the expansion of student research projects from individual classroom settings into whole-school and district settings. Presently, one of my former students is completing a district-sponsored study of the outcomes of online writing assessment, while another former student is conducting a national survey on the use of the block scheduling in high school settings, which will be used by his district and school board to inform their final decision-making process.

G. Implications for Practice.

The experience of teaching this course taught me a great deal about the capacity of educators. Though a majority of classroom teachers taking this course expressed aversion to reading and designing research at the beginning of the course, it was exhilarating to see the shift in teacher desire, understanding, and capacity by the end of the course. The light that came on as teachers dug deeply into formal research literature is a light that needs to be lit in every school and in every classroom. The field of education is shifting. The stakes are high in classrooms, and an emphasis on accountability demands that students achieve at a higher level. The reflections and conversations I had with my students during these courses reinforced for me the importance of training practicing teachers to engage in research-based practice to help accomplish this goal.

As I taught this research course, I was surprised that many practicing teachers had not previously retrieved professional literature from online sources; we were delighted, as we worked together, to find how rewarding and useful this process was. The students in my courses were university students with access to the extensive databases of a university library. However, though many states now have research databases for teachers, the quality of these databases needs to be examined. Perhaps partnerships between universities and public school districts could explore joint access to these data sources.

If, as we discovered in our research course, classroom teachers *can* access and utilize formal research and design and carry out research studies, it may be possible to reinvent educational research by more frequently involving *practitioners* and *professors* in collaborative, reflective, educational practice—thus strengthening the creative bridge between universities and schools, and between educational theory and practice.

H. Implications for University Instruction.

As instructors, using self-study and research-based teaching strategies requires us to survey relevant literature, examine current best practices, and draw on personal experience, knowledge, and understanding to enhance university course design. It is by living the experience of teaching, paying attention, designing ongoing assessment, asking for student feedback, taking time to reflect, and moving repeatedly through this spiraling, cyclic process, that teaching improves.

I. Future Research Directions.

I've communicated with many class members about their post-course experiences, offering independent study credit and collaborative support for students wanting to complete their proposed research in their professional settings; however, I have not yet designed a study to formally examine shifts in teacher practice as a result of course training. This will, perhaps, be the focus of a future study. Other related research directions include studies on how practicing teachers implement action research, how they use research literature to inform their instructional practice, and further, what impact these changes have on student achievement and teacher effectiveness and satisfaction.

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