Innovative Higher Education, Vol. 28, No. 3, Spring 2004 (© 2004)

Increasing Research Self-Efficacy Among Students in Professional Academic Programs

Yvonne A. Unrau and Ann R. Beck

ABSTRACT: Gains in research self-efficacy for 60 Social Work and 75 Speech-Language Pathology students were compared. Our interest was to investigate whether students enrolled in both research and practice courses made greater gains in research self-efficacy over a semester, as compared to students enrolled in practice courses only. Findings indicated that Speech-Language Pathology students taking both research and practice courses showed the greatest gain. Examination of the Speech-Language Pathology curriculum suggested that when research courses were augmented with opportunities to apply research learning outside of class, greater gain in student confidence was achieved. We discuss implications for curricular development and interdisciplinary discourse on curriculum matters, and these implications reach beyond the two specific disciplines.

KEY WORDS: research; curriculum; interdisciplinary collaboration.

Professionals in service-oriented fields must base their interventions on theoretically sound and empirically based treatment methods in order to provide the highest quality of service to the people with whom they work (Lubinski, 1998). The foundation for such quality services is research. Without support for and interest in continuing research, there is danger that "our professional house will collapse" (Seymour, 1997, p. 7).

In fields such as social work (SW) and speech-language pathology (SLP), both professional codes of ethics and educational accreditation bodies state what students ought to know and what skills they ought to possess upon entry to their profession. Research, which is one part of most professional curricula, is definitively promoted as a core skill for beginning professionals. The National Association of Social Worker's *Code of Ethics* (1999), the Council on Social Work Education (CSWE), and the Standards and Implementation for the Certificate of Clinical

Yvonne A. Unrau is Associate Professor in the School of Social Work, Western Michigan University. She received her Ph.D. from the University of Utah. Ann R. Beck is Professor in the Department of Speech Pathology and Audiology, Illinois State University. She received her Ph.D. from the University of Illinois at Urbana-Champaign. Correspondence should be directed to Ann R. Beck, Department of Speech Pathology and Audiology, Illinois State University, Campus Box 4720, Normal, Illinois 61790-4650; e-mail: arbeckau@ilstu.edu.

Competence in Speech-Language Pathology as established by the American Speech-Language-Hearing Association (ASHA) all assert that students cannot fully achieve competence as practitioners without research knowledge or skill.

The Problem

Research has been the silent curriculum partner in preparing SW and SLP practitioners. While evidence-based intervention methods are increasingly being used to teach SW practice, there continues to be a lack of attention to published research articles in SW practice courses (LeCroy & Goodwin, 1988). Additionally, few masters-level students in the field of SLP take an active part in research projects, and most graduate with "little or no interest in research" (Blishak & Cheek, 2001, p. 10). Thus, while professional and academic expectations are that students integrate research into their practice frameworks and that research tools should be considered well-used instruments of the competent practitioner, it is not at all clear to what degree students in university-degree programs such as SW and SLP are learning research skills. Furthermore, studies consistently show that SW students do not exercise research knowledge and skills in their early years of entering the profession (Bisman & Hardcastle, 1999; Kirk, 1990; Marino, Green, & Young, 1998). Similarly, SLP employers perceive new SLP practitioners as poorly prepared in the area of conducting clinical research (Henri, 1994), and practicing SLPs have been reported as feeling distanced from research (Blischak & Cheek, 2001). Indeed, the problem of fading research knowledge and skill is a phenomenon relevant in both SW and SLP professions and beyond.

Research atrophy after graduation should be the concern of both professional and academic institutions. Since the educational experience typically precedes employment, more can be done to fortify research knowledge and skill while students are enrolled in educational programs. Before proposing or launching innovations in research instruction or curricula, however, a greater understanding is needed of how professional students learn research, as well as where in the curriculum they learn it.

Purpose of Study

The purpose of this study was to explore how practice and research courses within professional education programs contribute to students'

research self-efficacy, which is defined as "the extent to which students are confident about carrying out different research tasks, from library research to designing and implementing practice research projects" (Holden, Barker, Meenaghan, & Rosenberg, 1999, p. 464). Of further interest to us was how SW and SLP students' confidence regarding research compared since both are service-oriented fields in which traditionally students study to be practitioners and not researchers. Monitoring or tracking research confidence across research and practice courses can assist educators from many disciplines in making curricular adjustments to promote life-long interest in research among students who are studying to be professional practitioners. The motivation for pursuing the study was based in its potential for practical significance for developing research curricula within professional programs.

Methodology

Participants

The sample for this study was a cross-section of 135 students enrolled as majors in either SW ($n = 60$) or SLP ($n = 75$) programs at Illinois State University, a large midwestern state university (population approximately 20,000). The sample was drawn from graduate and undergraduate SW and SLP courses offered over three semesters (Fall 2000, Fall 2001, and Spring 2002) in order to achieve respectable subsample sizes of unduplicated cases. The demographics of gender and age were similar for students in both majors (i.e., SW and SLP). The majority (93%) of students in both majors was female. Of the 10 males in the sample, two were undergraduate SW students, four were graduate SW students, and four were graduate SLP students. With a median age of 23 years, the SW student group was an average of one year older than the SLP group, but the difference was not statistically significant at the .05 level. SW students, who ranged in age from 19 to 50 years old, were more heterogeneous than SLP students who ranged in age from 21 to 39 years old. No other demographic data were collected.

Design

A pre-test post-test comparison group design was used to investigate the change in students' ratings of self-confidence with research from the beginning to the end of a 16-week semester. We compared change scores

across the two majors (i.e., SW and SLP). Additionally, we compared change scores across two groups of students who differed in their particular mix of course enrollment for the semester: (1) The practice-only group consisted of 54 students ($n = 27$ SW and $n = 27$ SLP) enrolled in practice-based courses but not in a research methods course, and (2) the research-plus-practice group consisted of 81 students ($n = 33$ SW and $n = 48$ SLP) who were enrolled in both practice-based courses and a research methods course. The samples were drawn from undergraduate and graduate students in both majors.

Instrumentation

The data collection instrument was the Research Self-Efficacy (RSE) Scale (Holden, et al., 1999), a self-report survey designed to assess students' confidence in their ability to perform specific research tasks. Scale items for the RSE are provided in the Appendix. Respondents rated their confidence on each of the nine research tasks using an 11-point scale that ranged from 0 to 100 ("0" cannot do at all, to '50' moderately certain can do, to '100' certain can do). A total RSE score was computed by summing responses for individual items, then dividing by the total number of items. The RSE is reported to have good internal consistency with Chronbach's alphas of .94 at pretest and posttest (Holden, et al, 1999). While the RSE was designed to test research self-confidence among social work students, the scale also has face validity for use with students enrolled in other professional programs.

To supplement data collected from the RSE, we developed a checklist that asked students to identify which courses in their major they were either taking, had previously taken, or had not yet taken. Finally, an open-ended question was added to the second administration of the RSE at the end of the semester. This question was "What experiences have you had to explain your level of research confidence?"

Procedure

After receiving University Institutional Review Board approval to proceed with the research, instructors of research and practice courses in SW and SLP programs were recruited to administer the measurement instruments during the first and the last weeks of the semester. In total, six SW and two SLP instructors participated. Student respondents remained anonymous by creating a unique identification code with the following information: the month of their birth, the first two

letters of the city in which they were born, the first two letters of their mothers' maiden names, and their favorite color. These anonymous IDs were used to pair pre and posttest scores. Anonymity of respondents was used to minimize bias related to social desirability (Holden, et al. 1999). The survey instrument was administered during class, and it took approximately 10 minutes to complete. Student participation was entirely voluntary, and no incentives (e.g., extra credit points) were provided as a condition of participation.

SW and SLP Curricula

Because SW and SLP students were compared in the study, discussion about curricula similarities and differences is important to understanding the educational context of study participants. Table I highlights key program features that SW and SLP programs had in common, as well as those that were unique. In sum, the SW and SLP program similarities were that they shared a common vision of the role of research in relation to practice, as well as a comparable approach to teaching research.

Table I also shows that the SW and SLP programs differed in terms of their longevity, practicum placement settings, and curricular structure. One difference was that while SW and SLP departments, with 30 and 40 years respectively, both shared a long history at the university, the SW graduate program was two years "new" at the time of this study. Another major difference was the integration of SLP practice and research through a Speech and Hearing Clinic that was located within the SLP department and operated by its faculty. In addition to providing structured learning in a practical setting, the clinic provided a platform of professionalism that SLP students experienced throughout their studies. In contrast, SW did not have an equivalent clinic. Rather, SW students were exposed to a practicum only after completing their coursework, and all practicum settings were in community agencies which were neither affiliated with the university nor located on its campus. Finally, the SW curriculum included more stand alone research courses when compared to the SLP curriculum. The program similarities and differences shown in Table I were illuminated as part of the research process and help shed light on the study results.

Results

This study involved one dependent variable, which was the change in students' RSE scores from the beginning to the end of the semester, and

Table I
Similarities and Differences Between Social Work and Speech-Language Pathology Curricula

Similarities (social work and speech-language pathology)	
• Research is taught as a professional tool to improve practice. • Both quantitative and qualitative research are taught. • Research assignments include designing and implementing a research project. • Research courses taught by academics within the discipline.	
Differences	
Social work	**Speech-language pathology**
• Graduate program is 2 years old and the majority of students are part-time.	• Graduate program is 40 years old and the majority of students are full-time.
• Practicum settings were off-campus in community agencies that were not affiliated with the university.	• Located within and operated by the SLP Department was a Speech and Hearing Clinic that provided speech, language, and audiology services to the public. The clinic was the practicum setting for all SLP students.
• Undergraduate curriculum had one required introductory research course taken prior to practicum	• Undergraduate curriculum did not include a separate research course; instead, research content was infused in practice courses.
• Graduate curriculum had two advanced research courses both taken prior to practicum, and a third research course taken concurrently with practicum.[a]	• Graduate curriculum had one research course taken concurrently with practicum.
• Undergraduate—practice courses taken prior to practicum. Clinical skills exercised in "mock" settings (e.g., role plays)	• Undergraduates enrolled in practice class were assigned to a graduate student clinician whom they observed at the clinic.

[a]Given the newness of the SW graduate program, none of the SW students included in this study had reached the final research course in the SW curriculum, where research and practicum were taken concurrently.

two independent variables: students' major (SW vs. SLP) and course mix (research-plus-practice vs. practice-only). We calculated descriptive statistics (i.e., means and standard deviations) for various groups and subgroups. Results of the differences in pre and post RSE score means for major groups, course mix groups, and major by course mix groups were inspected in order to examine the association of both independent variables with the dependent variable. The results are presented next

by comparing gains in research self-efficacy first between SW and SLP majors and second between students taking research-plus-practice versus students taking practice-only courses. Finally, we compare gains in research self-efficacy across the four groups produced when major and course mix variables are combined (e.g., SW-research-plus-practice, SW-practice-only, SLP-research-plus-practice, SLP-practice-only).

Gains in Research Self-Efficacy by Major

Overall, the results indicated that all students increased their confidence in performing research tasks from the beginning ($M = 49.8$, $SD = 21.8$) to the end of the semester ($M = 68.6$, $SD = 19.7$). With respect to major, the average gain in confidence reported by SLP students from the beginning to the end of the semester ($M = 23.9$, $SD = 21.3$) was greater than the average gain reported by SW students ($M = 12.4$, $SD = 18.3$). Table II reports the mean RSE item and total scores for SW and SLP students at pretest and posttest, as well as the mean gains made by each major over the 16-week semester.

A comparison of individual RSE items across the two majors in Table II shows that SW students generally scored higher at pretest and reported less gain at posttest, compared to SLP students. Furthermore, SLP students reported significantly higher gains in confidence for six of the nine RSE items: writing literature reviews, forming questions and hypotheses, research design, sampling, data analysis, and presenting study and implications.

Gains in Students' Research Self-Efficacy by Course Mix

Course mix also was associated with gains in self-confidence over the semester. Table III reports the mean RSE scores for practice-only and research-plus-practice groups at pretest and posttest, as well as the mean gains made by students enrolled in the two course mixes. Overall, students enrolled in research-plus-practice courses made greater gains in RSE over the 16-week semester ($M = 25.9$, $SD = 20.1$) than students in the practice-only group ($M = 8.2$, $SD = 17.0$). When examining individual RSE items by course mix, a familiar pattern appears; that is, practice-only students generally score higher at pretest but show less gain than research-plus-practice students. Table III also shows that students taking a combination of research and practice courses made significantly greater gains for six of the nine RSE items. Five items that

Table II
Mean Self-Efficacy Pretest Posttest Scores by Major

Research self-efficacy items	*n*	Pretest	Posttest	Difference	*p*
1. Electronic Literature Search					
Social Work	60	59.3	73.1	13.8	ns
Speech-Language Pathology	75	61.6	79.1	17.5	
2. Use technology in Research					
Social Work	60	54.2	63.5	9.2	ns
Speech-Language Pathology	75	52.8	66.5	13.7	
3. Write Literature Reviews					
Social Work	60	54.3	64.3	9.9	<.025
Speech-Language Pathology	75	51.2	82.4	31.2	
4. Form Questions & Hypotheses					
Social Work	60	58.3	69.8	11.5	<.008
Speech-Language Pathology	75	54.1	78.0	23.9	
5. Research Design					
Social Work	60	47.8	61.7	13.8	<.001
Speech-Language Pathology	75	43.7	72.0	28.3	
6. Sampling					
Social Work	60	46.5	60.3	13.8	<.005
Speech-Language Pathology	75	41.5	69.6	28.1	
7. Measurement					
Social Work	60	40.8	58.7	17.8	ns
Speech-Language Pathology	75	40.8	67.5	26.7	
8. Data Analysis					
Social Work	60	40.7	55.3	14.7	<.025
Speech-Language Pathology	75	38.8	64.8	26.0	
9. Present Study & Implications					
Social Work	60	59.0	66.3	7.3	<.004
Speech-Language Pathology	75	53.3	73.5	20.1	
Total RSE Score					
Social Work	60	51.2	63.7	12.4	<.001
Speech-Language Pathology	75	48.6	72.6	23.9	

were significant when the variable major was analyzed were also significant for course mix (i.e., forming questions and hypotheses, research design, sampling, data analysis, presenting study and implications); however, one new item appeared (i.e., measurement).

Gains in Research Self-Efficacy by Major by Course Mix

When total RSE change scores, major, and course mix variables were all evaluated simultaneously, SLP students in the research-plus-practice group showed greater gains in RSE scores than any other group. This result is shown in Figure 1, which displays the four

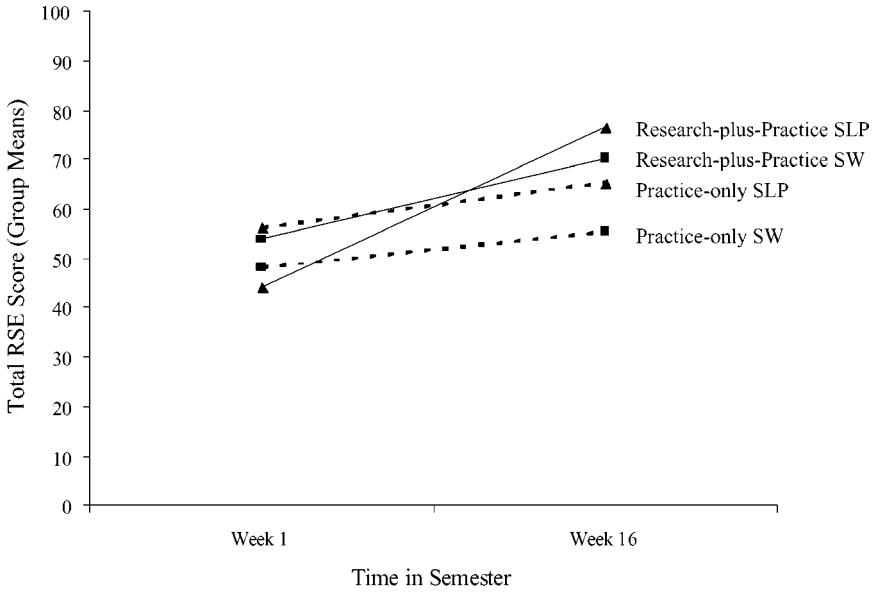
Table III
Mean Self-Efficacy Pretest Posttest Scores by Course Mix

Research self-efficacy items		*n*	Pretest	Posttest	Difference	*p*
1. Electronic Literature Search						
Practice-only	54	54.6	70.0	15.4	ns	
Research-plus-Practice	81	64.6	80.7	16.1		
2. Use technology in Research						
Practice-only	54	55.0	64.4	9.4	ns	
Research-plus-Practice	81	52.4	65.7	13.3		
3. Write Literature Reviews						
Practice-only	54	52.8	72.1	19.4	ns	
Research-plus-Practice	81	52.4	75.8	23.3		
4. Form Questions & Hypotheses						
Practice-only	54	60.7	62.6	1.9	<.0001	
Research-plus-Practice	81	52.8	82.2	29.4		
5. Research Design						
Practice-only	54	45.7	55.9	10.2	<.0001	
Research-plus-Practice	81	45.4	75.1	29.6		
6. Sampling						
Practice-only	54	48.3	53.9	5.6	<.0001	
Research-plus-Practice	81	40.6	73.2	32.6		
7. Measurement						
Practice-only	54	46.3	51.5	5.2	<.0001	
Research-plus-Practice	81	37.2	71.6	34.4		
8. Data Analysis						
Practice-only	54	45.2	50.6	5.4	<.0001	
Research-plus-Practice	81	35.9	67.3	31.4		
9. Present Study & Implications						
Practice-only	54	61.1	62.8	1.7	<.0001	
Research-plus-Practice	81	52.4	75.3	23.0		
Total RSE Score						
Practice-only	54	52.2	60.4	8.2	<.0001	
Research-plus-Practice	81	48.2	74.1	25.9		

combinations of subgroups that resulted when major (SW vs. SLP) and course mix (research-plus-practice vs. practice only) variables were examined together.

Figure 1 shows the SW and SLP practice-only groups as making nearly parallel gains, with average RSE gains of 9.1 and 7.4 points, respectively. However, the SLP practice-only students both start and end with greater levels of confidence when compared to SW practice-only students. This parallel pattern did not re-emerge when comparing RSE gains made by both majors in the research-plus-practice group. Rather, the SLP students taking research-plus-practice started out with the lowest average level of confidence overall but then surpassed all

Figure 1
Average Gains in Total RSE Scores by Course Mix for SW and SLP Majors ($N = 135$). Dashed lines represent practice-only groups, while solid lines represent the research-plus-practice groups. Lines anchored by triangles represent the SLP student groups, while lines anchored by squares represent the SW student groups.



other groups in RSE gain by the end of the semester, including their SW counterparts in the research-plus-practice group. The mean gains in self-confidence made by SW and SLP student taking research-plus-practice, as shown in Figure 1 were 16.6 and 32.2 points, respectively.

However, because the SLP students in the research-plus-practice group consisted of only graduate students and the SW group was composed of 18 graduate students and 15 undergraduate students, we hypothesized that the differential gain made by SW and SLP students shown in Figure 1 was confounded by level of education (i.e., graduate vs. undergraduate). To test this possibility, a *t*-test was performed to compare gains made between the two majors using only the subset of graduate students in the research-plus-practice group. Specifically, 18 SW graduate students were compared to 48 SLP graduate students using the difference score (i.e., posttest–pretest) of the RSE as the

dependent variable. The result was that SW graduate students gained 19.3 points (SD = 19.5) and SLP graduate students gained 32.3 points (SD = 17.2) over the course of the semester, a difference that was statistically significant ($t = -2.7$, df = 64, $p < .01$). Consequently, the rival hypothesis—that differential gains in RSE scores made by SW and SLP students in the research-plus-practice group were attributed to differential proportions of undergraduate and graduate students—was ruled out.

Open-Ended Question Responses

The responses given by SLP students to the question "What experiences have you had to explain your level of research confidence?" indicated that many of them were generally confident with research ability at the end of the semester. This was true for SLP students in both the practice-only and the research-plus-practice groups. Indeed one practice-only student wrote that she had no experiences to explain her research confidence; she just had "personal confidence." The most often cited experiences by the practice-only SLP students that accounted for their research confidence were researching literature and writing papers based on this research.

Responses from SLP students in the research-plus-practice group suggested that students attributed their level of research confidence to three main experiences. The most frequently cited experience was taking the research course and completing the class assignment that required the students to write an Institutional Review Board proposal. This assignment required students to originate a research question, write a review of the literature supporting that question, design a study that answered the question, indicate how data collected would be analyzed, and indicate how the student would meet ethical considerations regarding treatment of human subjects (this included writing consent forms and assent scripts, if necessary). Two other experiences frequently cited were writing literature reviews for other classes and conducting their own research for a graduate level independent study.

Open-ended responses of SW students in both groups (research-plus-practice and practice-only) were mixed. Open-ended responses by SW students in the practice-only group were similar to students in the SLP practice-only group. That is, SW practice-only students by and large commented on activities related to looking up research (e.g., researching in the library or on the web, researching a topic through journal articles) to explain their levels of research confidence.

Open-ended comments from SW students in the research-plus-practice group told a different story. While the preponderance of SW responses echoed the positive gains shown by the quantitative findings, there was a small number of SW students who even after completing a 16-week research course did not report appreciable gains in RSE scores. The majority of SW responses reflected gains in confidence but remarks of "feeling shaky" in research knowledge and skill at the end of the semester surfaced in the open-ended responses. With respect to experiences that SW students said explained their current levels of research confidence, the majority of comments from students taking research pointed to specific assignments from their research class (e.g., literature reviews, doing a research project, reading research articles) but no particular assignment emerged as a "group favorite." Also, there were no comments to suggest that students' confidence with research was related to events outside of their research course.

Discussion and Implications

The major aim of this study was to explore whether course mix (research-plus-practice and practice-only) within professional-degree curricula was associated with differential gains in students' confidence with research knowledge and skill. The comparison group design used in the study was limited by several known threats to internal validity; most relevant were history, maturation, regression, and differential selection effects. These limitations prevent us from drawing definitive conclusions abut which factors most influenced research self-efficacy for students. However, the study findings point to several useful implications for educators striving to improve their research curricula and for researchers who study the scholarship of teaching and learning research in professional-degree programs.

One implication relates to the development of student learning goals for research curricula. Overall, students' self-confidence as reflected by RSE scores, increased over the course of a semester. Given the threat of maturation this was not a surprising result; yet it holds important implications for planning curricular outcomes. As discussed at the beginning of this article, professional organizations such as the National Association of Social Workers, the Council on Social Work Education, and the American Speech-Language-Hearing Association have influence on the education and expectations of students aiming to join their respective professions. One area of influence is pressure for educational

programs to set achievement standards for graduating students and to monitor such outcomes.

The findings of this study suggest that educational programs can expect that students' taking research courses will significantly increase confidence with performing research tasks over the course of the semester, regardless of curriculum structure. Thus, programs setting benchmarks, or expected levels of achievement, ought to go beyond stating generic outcomes (i.e., student knowledge or confidence with research will increase over the semester) and declare the amount of gain expected (i.e., student knowledge or confidence with research will increase by "X" percent over the semester). The amount of increase that any one program might expect of their students ought to be determined through a baseline measure, which can be accomplished through a pretest measure such as the one used in this study.

Declaring the amount of gain expected by students over the course of a semester can also aid in identifying students who both struggle to learn research and straggle behind their peers in the learning process. Using the RSE as a midterm learning assessment tool, for example, can alert students and instructors alike to learning problems early on in the semester.

A second implication has to do with how practice and research courses each contribute to student learning with respect to specific research tasks. Students in the research-plus-practice group made greater gains in their total RSE scores over the course of a semester than did students in the practice-only group. Again, this was not an unexpected finding because research courses are designed to teach students about research and to increase their confidence and ability to understand and to conduct research specific to their professions.

Of more interest was that course mix was *not* associated with gains in students' confidence in the areas of performing electronic literature searches, using technology for research, or writing literature reviews (see Table III). In other words, whether SW and SLP students were enrolled in research-plus-practice or practice-only courses did not help predict confidence gains for these three research tasks. It may be that these tasks are natural bridging topics that fit easily into the flow of both practice and research courses. Coordination of these activities across the curriculum is possible if research and practice instructors discuss how they intend to approach these three bridging topics in their respective courses. Such dialogue between instructors both decreases the risk of duplicating material across courses and increases the likelihood of integrated learning across the curriculum.

A third implication of the study focuses on specific in-class and out-of-class experiences that offer reasonable explanation for the interaction of major by course mix over time of testing, which clearly showed that SLP students taking both research and practice courses together had the highest rate of gain in research self-confidence over the semester. The "accelerated" gain in confidence of this group compared to all others is clearly depicted in Figure 1. In an effort to understand this finding more fully, cursory interviews with course instructors and reviews of course syllabi for SW and SLP courses were conducted. While the material covered in the SLP and SW research courses appeared to be similar and the research assignments across the two majors were comparable, there were notable differences in the experiences of SW and SLP students related to research. Within their respective research courses, SLP students highlighted the assignment of completing an Institutional Review Board proposal as an explanation for their increased confidence, while no particular activity was singled out by SW students.

Experiences of SW and SLP students outside their research courses were also unique in seemingly important ways. SW students did not single out any one experience outside of class as adding to their research confidence, whereas SLP students did. Specifically, the majority of SLP students taking research pointed to writing extensive literature reviews for other classes and being involved in some phase of conducting research for their graduate level independent studies. As reported by McKinney, Tchernykh, Vacca, and Malak (2002), increases have been noted in students' academic development, knowledge acquisition, and other measures of cognitive and academic growth when they work with faculty on research projects outside of class. In contrast, SW assignments in non-research courses were split between writing literature reviews and reflective-type papers; the latter of which were designed to raise self-awareness about one's values, beliefs, and ethics related to issues of working with disenfranchised people and social justice.

Referring back to Table I, which displays structural program differences between the SW and SLP programs, it may be that the structure of the SLP program offered its students more opportunities to apply knowledge and skills acquired in the research course to both academic and practical scenarios. Additionally, SLP students who were in research-plus-practice courses were typically involved in a practicum experience where they were conducting diagnostic and intervention services under the supervision of certified speech and language pathologists. Research on active learning indicates that the more opportunities students have to use information actively (e.g., discuss, question,

clarify, explain, write), the better that information is learned and retained by students (Meyers & Jones, 1993).

Our last point for discussion addresses another limitation that we learned about after the study was completed. The limitation concerns the use of self-report ratings of student confidence as the sole measure of the dependent variable. The issue at hand is that people ranked in the bottom quartile of performance have been shown to over estimate their ability consistently (Kruger & Dunning, 1999). In a study that reports a series of four experiments, Kruger and Dunning point out that "incompetence not only causes poor performance but also the inability to recognize that one's performance is poor" (p. 1130). In other words, the students in the current study who rated themselves as most confident, especially at pretest, may have been the least competent of all.

While it is clear that caution must be used in interpreting results based on students' ratings of self-confidence, it is unlikely that the results of the current study are overly biased by inflated self-confidence ratings of students who were "poor performers." Kruger and Dunning (1999) explain that when skills are learned and competence improves, self-ratings of ability become more closely calibrated to actual ability levels. Therefore, students in the research-plus-practice group likely provided more accurate ratings relative to their actual research ability than students in the practice-only group. Indeed, a look at Figure 1 shows that students in practice-only groups reported higher levels of confidence at pretest than their counterparts who were enrolled in a research course that semester, yet neither group had been exposed to research instruction.

Professional codes of ethics stipulate that practitioners have a responsibility to ensure competence of their work so that their clients and patients will be protected from harm (e.g., National Association of Social Workers, 1999). Research, which is addressed as a core part of professional ethics in SW and SLP fields, calls for competence in several skill areas to ensure that clients or patients are not harmed when they participate in evaluation or research and that research results are properly reported. In light of Kruger and Dunning's (1999) findings perhaps instructors ought to teach to both research ability and awareness of research ability in the curriculum.

The work of Kruger and Dunning (1999) emphasizes that multiple measures are desirable in any study to triangulate results. In the current study, for instance, the inclusion of research ability or performance measures would have been ideal. Instead, we thought retrospectively in search of existing behavioral indicators of research performance among

students in our sample. In doing so, we found greater support for the argument that outside class activity reinforces learning and increases student confidence. Specifically, of the 48 SLP students in the research-plus-practice group, one was currently writing the last chapter of her thesis, 23 completed research-based independent studies as their terminal graduate project, and five presented their results at the Graduate Research Symposium held at the university at which this study was completed. In turn, only one of the undergraduate SW students elected to take a research independent study, and there were no SW students participating in the university's research symposium program.

Conclusions

Whatever the cause for changes in research confidence, students in one course can possess different levels of confidence in their abilities. As Lee (1997–1998) states "what we know about learning points to the initial state of learners—their prior knowledge and experiences with the course material at hand—as the starting point of instruction" (p. 1). This suggests that instructors who are concerned with increasing students' confidence in their ability to apply research knowledge and skills must be aware of students' beginning levels of confidence regarding research. Activities should then be used which not only increase students' confidence in their research knowledge and skills, but also, and perhaps more importantly, their actual ability levels in these areas. Activities such as conducting reviews of literature, analyzing published research, and writing research papers appear to be course activities that serve to build confidence in research skills early on in an educational program. Additionally, opportunities to engage students in research projects under a faculty mentor and to apply research knowledge and skill to real-life practice may assist students to reinforce and enhance the information they learn in formal research courses and to transform confidence into performance.

As a final comment, this study illustrates the benefit of interdisciplinary discourse and investigation into curriculum development. The SW and SLP programs sampled in this study shared similar views about the role of research in their respective professions, as well as approaches to research instruction. Yet, students taking the SLP combination of research and practices courses were making greater gains than their social work counterparts. While the study design limits us from drawing definitive conclusions about what may have caused any increases in students' levels of confidence, the process of carrying out the

study and discussing the topic of research learning across professional disciplines resulted in expanded thinking about how best to structure professional curricula to promote research competency. Since research expectations across professions are more similar than they are different, faculty teaching research courses in professional education programs can expand their "instructional network" by tapping into ideas and experiences of colleagues in similar disciplines.

Appendix: Research Self-Efficacy (RSE) Items

How confident are you that you can . . .

1. do effective electronic database searching of the scholarly literature?
2. use various technological advances effectively in carrying out research?
3. review a particular area of social science theory and research, and write a balanced and comprehensive literature review?
4. formulate a clear research question or testable hypothesis?
5. choose a research design that will answer a set of research questions and/or will test a set of hypotheses about some aspect of practice?
6. design and implement the best sampling strategy possible for your study of some aspect of practice?
7. design and implement the best measurement approach possible for your study of some aspect of practice?
8. design and implement the best data analysis strategy possible for your study of some aspect of practice?
9. effectively present your study and it's implications?

Acknowledgment

This study was funded through a Teaching-Learning Development Grant awarded by the Center for the Advancement of Teaching, Illinois State University, Normal, Illinois.

References

Asha, *Background information and standards and implementation for the certificate of clinical competence in speech language pathology*. Retrieved May 8, 2003, from http://professional.asha.org/certification/slp_standards_new.cfm.

Bisman, C., & Hardcastle, D. (1999). *Integrating research into practice*. New York, NY: Brooks/Cole.

Blischak, D., & Cheek, M. (2001). "A lot of work keeping everything controlled": A class research project. *American Journal of Speech-Language Pathology*, *10,* 10–16.

Henri, B. (1994). Graduate student preparation: Tomorrow's challenge. *Asha*, *36,* 43–46.

Holden, G., Barker, K., Meenaghan, T., & Rosenberg, G. (1999). Research self-efficacy: A new possibility for educational outcomes assessment. *Journal of Social Work Education*, *35,* 463–476.

Kirk, S. (1990). Research utilization and the substructure of belief. In L.Videka-Sherman & W.J. Reid (Eds.), *Advances in Clinical Social Work Research*. (pp. 233–250). Silver Spring, MD: NASW Press.

Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, *77,* 1121–1134.

LeCroy, C.W., & Goodwin, C.C. (1988). New directions in teaching social work methods: A content analysis of course outlines. *Journal of Social Work Education*, *24,* 43–49.

Lee, V. (1997-1998). Relating student experiences to courses and curriculum. *Essays on teaching excellence, Vol. 9, No. 1 (pp. 1, 2).* Ft. Collins, CO: A Publication of the POD Network.

Lubinski, R. (1998). Foreword. In C.M. Frattalli (Ed.), *Measuring outcomes in speech-language pathology* (pp. ix-x). New York, NY: Thieme.

Marino, R., Green, R.G., & Young, E. (1998). Beyond the scientist-practitioner model's failure to thrive: Social workers' participation in agency-based research activities. *Social Work Research*, *22,* 188–192.

Meyers, C., & Jones, T. (1993). *Promoting active learning: Strategies for the college classroom*. San Francisco, CA: Jossey-Bass.

McKinney, K., Tchernykh, M., Vacca, K., & Malak, J. (2002). *Beyond the classroom: An exploratory study of out-of-class learning in sociology*. Manuscript submitted for publication.

National Association of Social Workers (1999). *Code of Ethics*. Washington, DC: Author.

Seymour, C. (1997). Research, graduate education, and the future of our professions. *Asha*, *39,* p. 7.