



Research on Teaching in Physical Education Doctoral Dissertations: A Detailed Investigation of Focus, Method, and Analysis

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As a part of their doctoral education, students complete a dissertation. Examining these dissertations can provide one analysis of research in a field. The primary purpose of this study was to analyze all physical education dissertations with a teaching focus that were completed between 1985 and 1999. All possible dissertations were examined through the electronic version of *Dissertation Abstracts International*. For the teaching dissertations ($n = 201$), each abstract was coded for (a) research type, (b) research focus, (c) student variable measured, (d) observation used, (e) interview used, (f) other methods used, (g) population, (h) general methodology, and (i) statistics reported/used. Most research on teaching dissertations addressed issues related to teacher effectiveness and focused on motor skill learning and attitude. There was an increase in qualitative methods from those reported in a previous study (Silverman, 1987). While there were methodological advances, many dissertations still used methods that were not informed by the research methods literature.

Key Words: research trends, graduate education, research methods

Virtually every student in a doctoral program completes a dissertation in order to graduate. The purpose of the dissertation research in general is to show research competence and to provide new information for the field. Dissertation research focuses on a range of topics and is more or less applied. The accumulated dissertations in a field are one record of the research interests and approaches that are being used to investigate questions of interest, in this case of persons obtaining doctoral degrees.

Research in a doctoral program, and in particular the dissertation, is the training ground for future research (Delamont, Atkinson, & Parry, 1997; Locke, Spirduso, & Silverman, 2000). Students who expect to have a career in higher education often use the dissertation research for early career publications (National Academy of Science, National Academy of Engineering, Institute of Medicine, 1997).

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The experience of planning and completing a dissertation should provide skills to continue research in a field. Students who hope to use their doctoral degree to further their career and practice, for example as an instructional supervisor in a school district, investigate topics that are of interest to them and other practitioners (Neumann, Pallas, & Peterson, 1999; Schoenfeld, 1999). While they do not aspire to have research and scholarship as a career goal, their research may provide information for both practitioners and scholars. Understanding the research being conducted by those completing the doctorate can tell us much about a field.

Analyses of doctoral dissertations inform us about the interests and preparation of doctoral student researchers (Cleary, 1992, 2000; Duncan & Pryzwansky, 1988; Silverman, 1987). Often research trends begin with graduate students and, historically, the field of physical education is no exception (Locke, 1977; Piéron, 1986). Research on doctoral dissertations has been conducted in a number of fields (e.g., Caffarella, 1999; Cleary, 2000; Grady & O'Connell, 1993; Harmon, Howley, & Sanders, 1996; Valerius & MacKay, 1993), and this information has informed scholars and doctoral advisors about the questions being asked, the variables being measured, and the methodology used to conduct research. An analysis of these trends can help researchers understand the state of doctoral level research and the congruence between discussions of doctoral preparation and the actual product of doctoral research.

In physical education pedagogy there have been analyses of both published research and dissertation research. Byra and Goc Karp (2000) analyzed qualitative research methods used in published studies, and Silverman and Skonie (1997) examined various aspects of published studies focusing on research on teaching in physical education (RT-PE). A previous study (Silverman, 1987) on research on teaching doctoral dissertations in physical education provided information on the focus, research methods, and other trends from 1975 to 1984. That study found, among other things, that most research was quantitative, about half was focused on comparisons between teaching methods, many researchers did not utilize systematic

observation despite this focus, and most occurred in school settings. However, there has been no analysis of RT-PE dissertations since 1984.

The field of physical education pedagogy can be thought of as having three subareas: teaching, teacher education, and curriculum (Silverman & Ennis, 1996). While these areas overlap, research in each area has a different focus. For example, curriculum research focuses on what is taught and the many factors that influence the content of physical education. Teacher education research focuses on teacher training and development from preservice to retirement. RT-PE focuses on the processes (e.g., how teachers structure class and what teachers and students do during class), social dynamics (the teaching environment and who interacts with whom), and outcomes (motor skill, attitude, knowledge, social responsibility, and physical activity and fitness) of physical education (Silverman & Ennis, 1996; Silverman & Skonie, 1997). An analysis of research in each area can shed light on what is occurring in our field. A longitudinal analysis of research in each part of a field can help us see the changes that have occurred (Cleary, 2000) and provide a perspective of doctoral training in that subarea.

Since 1984, the last year in Silverman's (1987) study, there have been many changes in the context of educational research (Lagemann & Shulman, 1999; Metz, 2001). For example, changes of research focus have been discussed (Lagemann & Shulman, 1999). There has also been more acceptance of a wider range of research

methods (Byra & Goc Karp, 2000; Locke, Silverman, & Spirduso, 1998; Locke et al., 2000). As Byra and Goc Karp (2000) indicated, many qualitative research methods are now commonly employed in sport pedagogy research. Understanding the research that has been conducted in doctoral programs in recent years can provide a framework for understanding the trends in research and doctoral studies in specific fields. The purpose of this study, therefore, was to describe RT-PE dissertations completed since 1984 and capture emerging trends in RT-PE dissertation research. This study provides 15 years of follow-up to Silverman (1987) and serves as a basis for analyzing changes in dissertation research that have taken place during those 15 years.

Method

This study primarily focused on doctoral dissertations completed in RT-PE. This focus was intentional because both of us have been engaged in RT-PE and because, when combined with the results from Silverman (1987), there would be a quarter of a century of detailed analyses of dissertations in one area. Dissertations published in *Dissertation Abstracts International* from 1985 to 1999 were included in the study. Abstracts were categorized as focusing on research on teaching, teacher education, or curriculum in physical education. The dissertations that focused on research on teaching were coded on a variety of factors including research type, focus, variables measured, and research methods used.

Selection

All dissertations ($N = 5,298$) published from 1985 to 1999 under "education, physical" in the electronic version of *DAI* were surveyed for possible inclusion in this study. This time frame was used since it immediately follows the Silverman (1987) study and included all dissertations for complete years that were available at the time the research was conducted. To complete further selection for this study, we created several phases.

First, based on the electronic identification and after an extensive discussion of the procedures, one of us classified the titles of all identified dissertations in physical education/kinesiology as either sport pedagogy or not sport pedagogy (e.g., exercise physiology, sport psychology, motor learning). The classification was intended to be inclusive, so if there was any doubt as to whether the dissertation might be sport pedagogy, it was included. The abstract and all other information about each sport pedagogy dissertation were printed out to use in the next phase of the study.

Three years (i.e., 20%) of the 15-year period were randomly selected and coded again by the other author. In addition, since further categorization and coding would occur once the entire abstract was read, this was deemed a large enough proportion of the time period to indicate whether retrieval identified those studies that should be included in the analysis. The percent agreement was above .94 for each of the 3 years and, in general, the initial coding of all years included the few dissertations upon which there was disagreement. Those identified in the initial coding were used for the next stage of the study.

Second, based on operational definitions, each dissertation that was selected based on title ($n = 1,165$) was then coded as (a) teaching ($n = 201$), (b) teacher education ($n = 160$), (c) curriculum ($n = 187$), or (d) other ($n = 617$). The operational definitions were determined by using those presented in previously published papers on research on sport pedagogy (Silverman, 1987; Silverman & Skonie, 1997) and discussions of the field (Silverman & Ennis, 1996). As noted earlier, research on teaching was defined as research on the processes, social dynamics, and outcomes (motor skill, attitude, social responsibility, physical activity and fitness) of physical education. We both coded all abstracts together and based our decisions on the abstract content. In the few instances when there was initial disagreement, each abstract was reread and discussed until agreement was reached. For all dissertations that were coded as sport pedagogy, descriptive information (author's last name, year completed, institution awarding degree, and degree awarded) was listed on a coding sheet. Since the primary focus of this study is RT-PE dissertations and to provide a follow-up to the Silverman (1987) study, those 201 abstracts were entered into the next phase of the study.

Abstract Coding

Each abstract was coded for research type, focus, student variable measured, observation used, interview used, other methods used, population, general methodology, and statistics reported/used. The categories and subcategories were developed based on previous research in physical education (Byra & Goc Karp, 2000; Silverman, 1987; Silverman & Skonie, 1997) and a desire to obtain maximum information about the focus and methodology of the studies. Initial categories and subcategories were developed and then pilot coding was conducted, categories were modified or added to, and the instrument was finalized. All categories and subcategories are listed in Figure 1.

Research Type. The type of research included the following subcategories: (a) effectiveness, studies directly or indirectly concerned with the impact of instruction on student learning; (b) cognition and decision-making, studies that focused on thought processes of teachers and students; and (c) instrument development and research, studies that focused on new instrumentation to measure processes or student variables, or research that focused on how research is done. Each subcategory

had choices delineating the types of research in physical education. Primary, and if appropriate, secondary, research type was coded.

Focus. The focus of the research was coded for each study. For example, if the purpose of the study was to examine whether students' motor skill improved, then motor skill was coded. Similarly, if the study described how students felt about their physical education classes, attitude would be coded. For all categories, the focus was coded based on the one or more aspects of physical education that was being examined in the study. In instances when there was more than one focus, all were coded.

Student Variable Collected. Student information that was collected as part of the study was coded. If more than one type of information was collected, it was coded. This category included all types of student variables (e.g., motor skill, knowledge, fitness tests, attitude) and a category called "proxy for motor skill," which reflected student process variables (student engagement, academic learning time— physical education, or practice trials) that have been found to be related to motor skill development (Silverman, Devillier, & Ramírez, 1991).

Research Type (primary & secondary, if appropriate) Effectiveness

Description	Comparison: Teachers
Content/presage	Comparison: Teacher/Coach Teacher behavior: Comparison
	Comparison: Students Teaching methods: Comparison
Comparison: Curriculum Teaching methods: Class organization	Comparison: Settings Teaching methods:
Student practice/engagement	

Cognition and Decision-Making

Student	Teacher – expert/novice
Teacher – planning	Combination <u>Instrument Development/Research</u>
Instrument development	Research methods

Focus (more than one, if appropriate)

Motor skill	Thinking skills
Attitude/perceptions	Psychological factors
Knowledge acquisition	Equity
Fitness/physical activity	Teaching process
Academic skills	Other

Student Variable Collected (more than one, if appropriate) Motor skill test Knowledge

Proxy for motor skill	Psychological variable
Attitude/perceptions	Academic skills
Fitness test	Other
Physical activity	None

Observation Used

Observation instrument	Fieldnotes Both observation instrument & fieldnotes
Other	

Interview Used (more than one, if appropriate)

Individual	Phenomenological
Focus group/group	

Other Methods Used (more than one, if appropriate) Stimulated recall Survey

Thinking aloud	Meta-analysis
Document analysis	ABA/multiple baseline
Critical incidents	Journals

Figure 1 — Coding categories and subcategories for RT-PE dissertations (cont. on next page).

Population

Preschool	Combination of school levels
Elementary school	College/university
Middle school	Children in community setting
High school	Adults in community setting

General Methodology

Qualitative	Quantitative
Both	

Statistics Reported/Used

Descriptive	None
Correlation/predictive	Can't tell Experimental/testing means

Figure 1 (Cont.) — Coding categories and subcategories for RT-PE dissertations.

Observation Used. This category included both systematic observation instruments (e.g., ALT-PE, coding of specific categories of teacher interaction with students, and any other instruments with predetermined categories to collect data on class processes) that are primarily quantitative, as well as observation using fieldnotes (i.e., collecting data by intense observation and taking notes without predetermined categories) that are primarily qualitative. Both categories could be coded, as could the category “other” (e.g., informal observations).

Interview Used. If an interview was used, the type was coded. Individual interviews were coded when only one participant was interviewed at a time. When more than one participant was interviewed, it was coded as focus group/group since pilot coding suggested it was difficult to differentiate in the abstract between the two types of interviews. Finally, phenomenological interviews (Seidman, 1998) were coded if the author specifically stated they were employed in the study. If more than one type was employed in a study, each was coded.

Other Methods Used. In order to include all methodological possibilities, other methods found in research on teaching in physical education were selections in this category. In most instances, the abstract directly stated these methods were employed and they were coded. If more than one other method was used, all were coded.

Population. The population of the student participants in the study was coded. Categories included both in-school and out-of-school participants and settings. The category “combination of school levels” was coded when more than one of the other school categories was reflected. In addition, other categories (e.g., college/university, children in community settings, adults in community settings) would be coded for studies that took place in settings other than K–12 schools.

General Methodology. The general methodology of the study was coded as either quantitative, where things were counted in order to summarize or compare using the quantitatively collected data, or qualitative, where the primary focus was on collecting rich data that were analyzed to provide an interpretation of the participant’s situation or to provide a critical analysis, based on Locke et al. (1998). This category yielded data that permitted general categorization and was intended to be supplemented by the other information that was coded. If the study had both a qualitative and a quantitative focus, the category “both” was coded.

Statistics Reported/Used. Statistics that were reported in the abstract were categorized as descriptive, correlation/predictive, or experimental/testing means based on the previous research and the definitions provided by Locke et al. (1998). If multiple statistics were reported, the statistic that addressed the goal of the research was coded; for example, in a teaching-methods comparison where both the means and the testing of means were available, then experimental statistics/testing means was coded. If no statistics were reported, as would be logical and expected in qualitative studies, none was coded. There was also a category for when it was not possible to ascertain which statistics were used.

Comments. The coding sheet allowed space for each of us to list comments about the study, for example when there was something peculiar or innovative about the study or something that should be remembered when interpreting the results.

Coding Procedures. During instrument development and prior to actual coding, we extensively discussed all categories to make certain they were clear. We both coded all abstracts by first reading the abstract and then coding all categories based on what was included in the abstract. In the few situations (less than 30 out of more than 2,000 decisions) where we did not agree, we reread the abstract and discussed it until we reached a consensus.

Data Analysis

All abstracts coded as sport pedagogy dissertations (i.e., teaching, teacher education, and curriculum) were reported for yearly trends, degree awarded, and for the institutions that awarded the degrees. RT-PE dissertations were analyzed for each coding category, for summed categories where multiple subcategories could be coded (e.g., the sum of all dissertations that had some focus on motor skill acquisition), and for combinations of coding categories (e.g., all possible combinations of methods used from the various methodological categories) across years. Computer analyses produced frequencies and percentages for each category. This yielded contingency tables that provided frequencies and percentages for all two-way combinations of the various categories, for example the observation used and other research methods. In addition, contingency tables, frequencies, and percentages were produced for all observation, interview, and other research methods combinations.

Results

The results are presented in two parts: background information from all sport pedagogy dissertations; and the detailed analyses of RT-PE dissertations.

Background Information on Sport Pedagogy Dissertations

A total of 548 dissertations were categorized as sport pedagogy for the 15-year period. As noted in Table 1, they are spread out across years and subareas

Table 1 Teaching, Teacher Education, and Curriculum Dissertations by Year

	Area			Year	Teaching Teacher Educ. Curriculum
	Total				
1985	15	9	14	38	
1986	16	7	4	27	
1987	7	8	11	26	
1988	14	11	10	35	
1989	14	21	10	45	
1990	4	10	12	26	
1991	8	16	13	37	
1992	19	17	11	47	
1993	15	8	18	41	
1994	16	10	12	38	
1995	14	11	14	39	
1996	14	4	9	27	
1997	16	8	13	37	
1998	19	11	20	50	
1999	10	9	16	35	
Total	201	160	187	548	

with variability across years and a range of 26 to 50 in any given year. All three subareas—teaching, teacher education, and curriculum—were well represented across the 15 years of the study.

Sport pedagogy dissertations were completed at 109 institutions of higher learning. Table 2 lists all universities where six or more dissertations were completed. In addition, 10 universities had five students complete dissertations, six had four dissertations, five universities had three dissertations, 15 universities had two students complete RT-PE dissertations, and 47 universities had only one dissertation completed during the 15-year period.

Analyses of RT-PE Dissertations

The data for each of the coding categories and combinations are presented below. All information for each category (e.g., population) is presented. In addition, the two-way combination of categories is presented for primary and secondary research types, and the two-way and multi-way combinations are presented for the observation, interview, and other research methods categories. Other category combinations are not reported because they produced predictable information (e.g., most descriptive studies used an observation instrument). The number of possible combinations produced by computer, if all were reported, would greatly lengthen this paper but add little new information.

Table 2 Institutions with Six or More Teaching, Teacher Education, and Curriculum Dissertations

Institution	Area			Total
	Teaching	Teacher Ed.	Curriculum	
Ohio State U.	20	16	10	46
Teachers College, Columbia U.	10	18	13	31
Florida State U.	11	13	5	29
Middle Tennessee State U.	3	10	13	26
U. of Northern Colorado	11	7	7	25
U. of Georgia	6	6	10	22
U. of North Carolina Greensboro	5	12	5	22
U. of Massachusetts	3	11	3	17
West Virginia U.	6	6	3	15
U. of Iowa	2	2	10	14
Louisiana State U.	13	1	0	14
U. of Southern Mississippi	6	3	3	12
U. of South Carolina	5	4	2	11
Michigan State U.	2	1	7	10
Oregon State U.	2	6	1	9
Temple U.	4	2	3	9
Texas A&M U.	2	1	6	9
U. of Alabama	3	1	4	8
Arizona State U.	2	3	3	8
Boston U.	2	4	1	7
Florida International U.	3	0	4	7
U. of Maryland	1	3	3	7
Brigham Young U.	4	0	2	6

U. of Minnesota	4	0	2	6
New York U.	2	1	3	6
Virginia Tech	4	1	1	6

Note: A total of 109 institutions produced pedagogy dissertations and 66 institutions produced teaching dissertations.

Research Type. Most of the RT-PE dissertations ($n = 186$, or 92.5%) were classified as teacher effectiveness studies. The largest number ($n = 86$, or 42.8%) of studies compared the effect of teaching methods on a student variable (e.g., motor skill or attitude). This was followed by descriptive studies of the teaching process ($n = 47$, or 23.4%), comparisons of teacher behavior ($n = 14$, or 7.0%), comparisons among teachers ($n = 12$, or 6.0%), and comparisons among students ($n = 10$, or 5.0%). Fewer studies were coded in the categories of cognition and

Table 3 Primary Research Types for Research on Teaching Dissertations

Research Type	Total for Subcategory	Total
<i>Effectiveness</i>		186 (92.5%)
Teaching methods: Comparison	86 (42.8%)	
Descriptive	47 (23.4%)	
Teacher behavior	14 (7.0%)	
Comparison: Teachers	12 (6.0%)	
Comparison: Students	10 (5.0%)	
Teaching methods: Student practice/Engagement	6 (3.0%)	
Comparison: Teacher/Coach	5 (2.5%)	
Comparison: Setting	4 (2.0%)	
Comparison: Curriculum on teaching Context/Presage	1 (0.5%)	
<i>Cognition and Decision-making</i>		8 (4.0%)
Teacher – Expert/Novice	3 (1.5%)	
Student	3 (1.5%)	
Teacher planning	2 (1.0%)	
<i>Instrument Development/Research</i>		7 (3.5%)
Instrument development	7 (3.5%)	
Grand total		201 (100%)

decision-making ($n = 8$, or 4.0%) and instrument development/research ($n = 7$, or 3.5%). Table 3 presents all categories that were coded for the primary research type.

Twenty-three (11.4%) dissertations included a secondary research type, indicating more than one purpose. The secondary purpose that occurred most frequently was a comparison of students ($n = 10$, or 5.0%). This was followed by instrument development ($n = 4$, or 2.0%), comparisons of teacher behavior ($n = 3$, or 1.5%), comparisons of settings ($n = 2$, or 1.0%), descriptive studies ($n = 2$, or 1.0%), comparison of teaching methods on student engagement/practice ($n = 1$, or 0.5%), and comparison of curriculum on teaching process ($n = 1$, or 0.5%).

When primary and secondary research type were cross-tabulated, seven (3.5%) studies had a primary-type teaching-methods comparison combined with a secondary-type comparison of students. There were 16 (or 8.0%) other combinations that were represented only once.

Focus. Most studies ($n = 86$, or 42.8%) had a component that focused on motor skill acquisition. This was followed by teaching process ($n = 59$, or 29.4%), attitude ($n = 41$, or 20.4%), fitness/physical activity ($n = 19$, or 9.5%), and knowledge acquisition ($n = 11$, or 5.5%).

Student Variables Collected. As might be expected by the focus on motor skill, a motor skill test was most often used ($n = 69$, or 34.3%) as a measure of student performance. Other studies ($n = 22$, or 11.0%), many that focused on motor skill acquisition, used a proxy of motor skill such as ALT-PE or student practice trials. No student data were collected in 55 studies (27.4%). Attitude data were collected in 44 (or 21.9%) studies, followed by fitness ($n = 15$, or 7.5%), knowledge ($n = 13$, or 6.5%), psychological variables ($n = 12$, or 6.0%), and physical activity ($n = 5$, or 2.5%) data.

Observation, Interview, and Other Research Methods. Three categories of the coding instrument were devoted to research methods, those focusing on observations, interviews, and other methods. When examined by observation types, it was found that systematic observation was used in 59 (or 29.4%) studies, fieldnotes were used in 24 (or 11.9%) studies, and both an observation instrument and fieldnotes were used in 9 (or 4.5%) studies. The majority of dissertations ($n = 109$, or 54.2%) did not use observation as a research technique.

Individual interviews were used in 39 (or 19.4%) of the RT-PE dissertations, and an additional one (0.5%) study used both group and individual interviews. No studies used group interviews alone or phenomenological interviews.

The most common other method used was a survey or questionnaire, which was used in about one-fourth of the studies (n

= 51, or 25.4%). This was followed by document analysis ($n = 9$, or 4.9%), applied behavior analysis techniques ($n = 7$, or 3.5%), stimulated recall ($n = 7$, or 3.5%), journals ($n = 2$, or 1.0%), meta-analyses ($n = 2$, or 1.0%), and think-aloud techniques ($n = 1$, or 0.5%).

When combinations of research methods were examined, the one that occurred most frequently ($n = 21$, or 10.5%) was the use of fieldnotes with individual interviews. This was followed by individual interviews with a survey or questionnaire ($n = 10$, or 5.0%), systematic observation with a survey or questionnaire ($n = 9$, or 4.5%), individual interviews with document analysis ($n = 8$, or 4.0%), and fieldnotes with document analysis ($n = 7$, or 3.5%). Both fieldnotes and systematic observation were used with individual interviews in 6 (or 3.0%) studies. Applied behavior analysis and systematic observation were combined in 5 (or 2.5%) studies. Systematic observation with individual interviews and the use of both systematic observation and fieldnotes with a survey or questionnaire were employed in 4 (or 2.0%) studies. Eight other combinations were used each in one or two studies.

Population. The majority of studies ($n = 137$) involved schoolchildren as the students in class. Of these, 55 were in elementary schools, 30 were in middle schools, and 8 were in high schools. The remaining 44 studies were conducted in secondary schools where the researcher did not further delineate the level ($n = 9$, or 4.5%), with a combination of levels ($n = 9$, or 4.5%), in special education classes ($n = 7$, or 3.5%), and in community settings (3, or 1.5%). Sixteen (8.0%) studies were conducted in K–12 schools but there was no indication of the level of the students. A large number of studies ($n = 43$, or 21.4%) took place in college or university classes. Two (1.0%) studies involved preschool children. Four (2.0%) studies involved adults as the students in community settings, and two (1.0%) other studies were conducted in a community setting but it was not possible to discern the age group from the abstract. In addition, for 11 (or 5.5%) studies neither the age of the students nor the location were given.

General Methodology. About two-thirds of the dissertations ($n = 150$, or 74.6%) employed quantitative methods to collect data. Qualitative methods were used in 35 (or 17.4%) studies. A combination of both qualitative and quantitative methods was used in 16 (or 8.0%) dissertations.

Statistics Reported/Used. As might be expected from the number of comparison studies, experimental statistics/testing of means was employed most frequently ($n = 113$, or 56.2%). Descriptive statistics were primarily used in 28 studies, and correlation/predictive statistics were used in 21 (or 10.5%) studies. From another five (2.5%) abstracts it was not possible to tell whether statistics were used.

Discussion

Background Information on Sport Pedagogy Dissertations

The sport pedagogy data on yearly dissertations and institutions suggest that a large number of students are completing dissertations that focus on physical education curriculum, teaching, and teacher education. Given the many positions advertised each year and recent discussions about the small number of faculty available for these positions (Solmon, 1999), the number of new doctoral graduates is surprising. Perhaps many of these students are not interested in higher education faculty positions and are pursuing the doctoral degree to enhance their knowledge and return to K–12 schools to assume instructional leadership positions, or for other reasons. This is common in other areas of education (Neumann et al., 1999) and should be seen as a positive contribution to our field.

Doctoral dissertations were completed at many institutions of higher education, some of which have a long history of producing doctoral graduates in our field and employing scholars who are actively engaged in scholarship. Other institutions, however, have students completing doctoral dissertations with a focus on physical education pedagogy, often without a faculty sponsor conducting research in the field (Silverman & Skonie, 1997). Students receive stronger content and research preparation when they are working with someone engaged in related research (Locke et al., 2000), and the lack of supervisors who work in the field may compromise the quality of the research. This may be a particular problem in institutions that only occasionally prepare doctoral students in pedagogy. Students who come to doctoral education with a warrant to use the information to improve physical education may leave without a thorough understanding of how research can contribute to our knowledge (Neumann et al., 1999).

Analyses of RT-PE Dissertations

The overwhelming majority of RT-PE dissertations focused on teacher effectiveness, and nearly half of all studies compared the effects of teaching methods on a student variable, teaching process, or student engagement. This is similar to the trends reported in previous studies of RT-PE research (Silverman, 1987; Silverman & Skonie, 1997). It is perplexing, given previous discussion on the difficulty of doing these studies in a way that can provide meaningful results because of issues related to sample size, unit of analysis, and the strength of treatments (Silverman, 1985, 1987; Silverman & Skonie, 1997; Silverman & Solmon, 1998). Two factors may be influencing the proportion of teaching methods comparisons. First, students who are based in K–12 education settings often are committed to doing research that addresses practical issues (Neumann et al., 1999). Second, professors at some institutions may believe that experimental forms of research are better than other forms. This erroneous assumption may lead students to use methods that have little chance of providing a reasonable answer to the questions they ask (Locke et al., 2000; Silverman, 1985).

While a number of studies focused on teaching methods, many others did not. There was a wider variety in topics addressed than in the previous study (Silverman, 1987). It was heartening to see that 3.5% of the dissertations focused on instrument development, because instruments that produce reliable and valid scores are needed for future research. Conversely, given recent discussions of cognitive paradigms in physical education (Lee, 1997), it was surprising that only a small percentage of dissertations focused on cognition and decision-making.

Many studies focused on motor skill acquisition and measured student skill or a proxy for student skill. This suggests that doctoral students are still very interested in a traditional aspect of physical education. Some studies that focused on teaching process clearly had as an underlying theme the promotion of student learning in the motor skill domain. This is consistent with past studies (Silverman, 1987; Silverman & Skonie, 1997). It also appears there is more focus on research on student attitude in physical education. Research in how students develop perceptions about physical education and physical activity is clearly needed (Lee, 1997; Silverman & Subramaniam, 1999). These results suggest that doctoral level researchers see the importance

of moving past a unidimensional focus on motor skill. Indeed, additional research on student attitude and on cognition and decision-making will enhance what we know about students' thoughts and feelings in physical education. This does not suggest, however, that research on attitude or cognition and decision-making should replace motor skill research, but that a frequent combination of the two will likely provide greater insight.

While motor skill and attitude were often the focus of research and these variables were measured in students, it was surprising that only a few studies focused on fitness and physical activity and measured these variables in students. Given the discussion of the *Surgeon General's Report* (U.S. Dept. of HHS, 1996) and research being reported in the field (McKenzie & Sallis, 1996), more studies on fitness and physical activity might have been expected. While it is difficult to tell if any trends are emerging from the current data, it may be that there is a temporary lag in dissertation research in this area.

As in many other fields (Caffarella, 1999; Dunston, Headley, Schenk, Ridgeway, & Gambrell, 1998; Rust, Soumaré, Pescador, & Shibuya, 1999; White, 1997), there was a large increase in qualitative methods from earlier time periods, from 3 over 10 years to 35 during 15 years (Silverman, 1987). This reflects a maturing of RT-PE research, that many questions are now of interest that were not in the past, and that many questions in our field cannot be answered through quantitative methods. Or, perhaps, more people who have been trained in qualitative methods are now faculty members advising graduate student research.

While there has been an increase in qualitative methods, much of the research employed quantitative methods. Part of this large representation is the result of teaching-methods research using traditional experimental designs. As has been suggested from an analysis of RT-PE research papers (Silverman & Skonie, 1997), it also is possible that many RT-PE questions, particularly those related to student achievement in motor skill, attitude, or physical activity and fitness, are most directly studied using quantitative methods. The use of a variety of research methods, both quantitative and qualitative, is good for the advancement of our field.

In the dissertations completed from 1985 to 1999, a large percentage of the researchers went into the gym to collect data using systematic observation or qualitative fieldnotes. This may suggest a decrease from earlier years (Silverman, 1987) in the number of teaching-methods studies that were completed without verifying the treatment through systematic observation. Although there may be other methodological problems with teaching-methods research, the greater proportion of studies that used observation instruments is welcomed. Shaver (1983) has suggested that teaching-methods research which does not verify the independent variable provides a weak treatment effect.

Surveys and questionnaires were employed in about 25% of the studies. From our analysis of the abstracts, it is difficult to tell whether these instruments underwent a process to see if the results produced were reliable and valid. The small number of studies that either had a primary or secondary focus on instrument development clearly addressed whether the instruments provided reliable and valid data. In some areas of RT-PE research, the use of instruments in which there has been little attention to reliability and validity has been a problem in interpreting the results (Silverman & Subramaniam, 1999). Those hoping to learn more about physical education teaching should pay careful attention to the use of current psychometric theory (McDonald, 1999) to ascertain whether surveys and questionnaires provide good data.

About half of the studies used multiple research methods to collect data. The largest number of these used fieldnotes and interviews. While it is valuable in all types of research, Marshall and Rossman (1999) and others (Creswell, 1998; Locke et al., 2000) specifically stated that the use of multiple data sources in qualitative research permits greater faith in the interpretation of results. This suggests that doctoral students are not only using qualitative research in greater numbers but that, by combining methods, they are addressing questions in ways that may provide stronger results. In addition, the use of multiple methods in quantitative studies yields more information to answer the questions posed in these studies.

Given that 186 out of 201 (or 92.5%) of the RT-PE studies addressed issues of teaching effectiveness, it is not surprising that most of the participants were elementary and secondary students. Nor is it surprising that experimental statistics/testing of means were used in over half the studies, given that there was a large number of teaching-methods comparisons. It is possible that methods comparisons and other teaching-effectiveness research were the focus of so many studies because of students' interest in improving practice (Neumann et al., 1999; Schoenfeld, 1999). These methods were seen, perhaps inappropriately, as the only way to complete a study that would have direct implications for practice.

A perusal of the authors of these dissertations suggests that many studies are never published in journals. While dissertation research is valuable, the publication of research in a journal comes with peer review and is easier for most professionals to retrieve than the original dissertation (Locke et al., 1998). Perhaps some of these dissertations were submitted for publication and not accepted in a journal.

It is more likely, however, that there was no attempt to publish an article. Given that many students completing RT-PE dissertations do not enter the higher education job market, this suggests that they did not perceive a benefit to publishing the paper. In addition, if they studied at institutions where faculty are not actively publishing, they may not have even considered the possibility. Conversely, if these students were like those in other education fields (Neumann et al., 1999) and had a strong desire to influence practice, publishing a paper with the results would make it more available to others.

In general, we do not have extensive information on the training of educational researchers (Pallas, 2001), and this is consistent with what we know about those preparing to do physical education research. While there have been discussions (e.g., Lagemann & Shulman, 1999) about how we should train educational researchers, most of the discussion is speculative and based on what those participating believe is important. This study may provide some insight into the state of doctoral education in physical education. Specifically, the goals of students conducting research in RT-PE and their preparation in research methods needs to be considered for the continued evolution of our field.

As was noted earlier and as has been discussed by others (Neumann et al., 1999; Schoenfeld, 1999), students who are enrolled in doctoral education may not have a primary goal of becoming educational researchers. They may want to complete a doctoral degree so they can provide instructional leadership in their school district or improve their own practice. Other students, however, may aspire to a career as an educational researcher. It seems appropriate that the preparation and research experience available to all students should be tailored to their goals. In most fields of educational research, students take courses to complete research requirements (Caffarella, 1999; Osguthorpe & Wong, 1993; Schoenfeld, 1999), but unfortunately these classes often are not based on how the student plans to eventually use what he or she knows about research. Both the generation and application of research are needed in our field, and having coursework, formal research requirements, and informal experiences (e.g., working with faculty members on their research or serving on statewide panels to recommend curricular changes) that address student goals will likely improve both research and practice.

Large aspects of this research preparation by doctoral students are the re- search methods classes they take—which often are the primary research training vehicles used to prepare educational researchers. A recent study (Silverman & Keating, 2002) suggested that qualitative methods have not been well integrated into introductory research-methods courses in departments of kinesiology and physical education, and that those who are teaching the courses may be from areas other than pedagogy with a less inclusive view of research methods. In addition, those classes taught in education departments may not provide a discussion of methodological alternatives in ways that students can participate in and learn about educational research (Metz, 2001).

Whether students are preparing for careers as researchers or practitioners, an understanding of methodology is important for evaluating or designing research (Locke et al., 1998). In many instances these research classes are seen as require- ments and do not help students develop necessary skills (Neumann et al., 1999). In a perfect world, classes would be selected for their content and what students learn, both cognitively and affectively, not just to meet the requirements. They would also be supplemented by extensive discussions of other facets of educational re- search (e.g., epistemological diversity in a field or what is ethical in specific re- search situations) that cannot be addressed in a course (Pallas, 2001).

The field of sport pedagogy has grown greatly over the past few decades. RT-PE dissertations are more diverse and address many more relevant questions than were addressed previously. Unfortunately, the data from this study also sug- gest that many doctoral students are still addressing questions and employing meth- odologies that previous discussions have suggested may be inappropriate. If the field is to grow, students should have coursework, informal experiences, and more formal research experiences that lead up to the dissertation (Neumann et al., 1999). Regardless of whether students want to use their degree to improve practice or to conduct research, or both, they will not develop skills and learn from their disser- tation work if it is only a hurdle to complete instead of being a positive experience that can be incorporated into their future work (Locke et al., 2000).

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