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LEARNING TO TEACH:
THE DEVELOPMENT OF TEACHING KNOWLEDGE IN TRAINED
AND UNTRAINED PHYSICAL EDUCATION TEACHERS

A Dissertation Presented

by

DANIEL Z. ROSENBERG

Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

DOCTOR OF EDUCATION

SEPTEMBER 1990

School of Education

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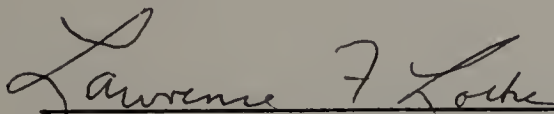
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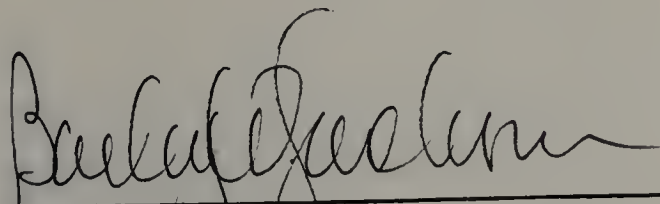
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ABSTRACT

LEARNING TO TEACH:

THE DEVELOPMENT OF TEACHING KNOWLEDGE IN TRAINED
AND UNTRAINED PHYSICAL EDUCATION TEACHERS

SEPTEMBER 1990

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The primary purpose of this study was to further the understanding of how people learn to teach. The central research question focused on differences in teaching knowledge that may be associated with training and experience. Eight teachers were selected to participate in this study. They represented a wide range of teaching experience, formal training, professional certification and sport participation. The common criterion for selection was previous experience in the teaching of volleyball. Data were collected from both questionnaires and transcribed interviews which followed the viewing of a twenty-minute videotaped volleyball lesson.

Results indicated differences among the participating teachers in content knowledge (the skills of playing volleyball), pedagogical knowledge (general teaching principles), and pedagogical content knowledge (content-specific teaching knowledge). The comments of trained teachers displayed a greater awareness of and concern for general teaching principles. In contrast, untrained teachers

devoted most of their comments to lesson content. Experienced teachers, whether trained or untrained, demonstrated a superior understanding of the relationship between the nature of content and the needs of learners at different levels of skill development. In that regard, they had a more elaborately developed sense of pedagogical content knowledge. Untrained teachers cited their experience as students and athletes as major sources of information about teaching, while trained teachers pointed to experiences associated with their formal training. Members from both groups indicated that they had learned from role models and early teaching experiences.

Among trained and untrained teachers the sources for the differences in knowledge, and how that knowledge was processed, included the following: varied teaching contexts such as public high schools and university classes, the extent of teaching experience which ranged from one to eighteen years, and views about teaching that were influenced by previous experience in either coaching or teaching roles. Implications for teacher education and staff development include a need for training experiences that will integrate various forms of teaching knowledge. In addition, it is clear that teacher preparation programs must deal much more explicitly with the differences between coaching and teaching contexts.

TABLE OF CONTENTS

	<u>Page</u>
ACKNOWLEDGEMENTS.....	iv
ABSTRACT.....	vi
LIST OF TABLES.....	xi
 Chapter	
I. INTRODUCTION.....	1
Teaching Knowledge.....	1
Developmental Influences.....	3
Prior Educational Experience.....	3
Formal Teacher Education.....	4
Teaching Experience.....	4
Statement of the Problem.....	5
Definition of Terms.....	6
Trained Physical Education Teacher.....	6
Untrained Physical Education Teacher...	6
Teaching Knowledge.....	6
Significance of the Study.....	7
II. REVIEW OF LITERATURE.....	8
Teacher Learning - How Do Teachers Learn to Teach?.....	9
Experiential Learning - Is Experience the Best Teacher?.....	18
Teacher Knowledge - Is There a Knowledge Base For Teaching?.....	27
Teacher Education Programs - Implications.....	33
Conclusion.....	37
III. METHOD.....	39
Data Collection.....	40
Background Questionnaire.....	40
Session One.....	40
Session Two.....	42
Participants.....	42
Formally Trained Physical Education Teachers.....	42

	Untrained Physical Education Teachers.....	43
	Access.....	43
	Videotaped Lesson.....	44
	Data Analysis.....	44
	Pedagogical Content Knowledge.....	45
	Research Issues.....	47
IV.	BIOGRAPHICAL PROFILES.....	48
	Novice, Untrained Subject Matter Specialists....	48
	Experienced, Untrained Subject Matter Specialists.....	51
	Novice, Certified Secondary Physical Education Teachers.....	54
	Experienced, Certified Secondary Physical Education Teachers.....	56
V.	RESULTS.....	61
	Topics Attended To And The Variability of What Was Noticed When Watching a Physical Education Lesson.....	61
	Lecture.....	63
	Use of Time.....	64
	Teacher Monitoring.....	66
	Teacher Feedback.....	68
	Learners.....	72
	Subject Matter.....	77
	Representation of the Subject Matter.....	81
	Class Management.....	87
	Knowledge Differences Associated with Training and Experience.....	92
	Content Knowledge.....	92
	General Pedagogical Knowledge.....	98
	Pedagogical Content Knowledge.....	102
	Influences on Teacher Development.....	108
	Role Models.....	109
	Training.....	111
	Experience.....	113
	Chapter Summary.....	118
VI.	DISCUSSION.....	122
	Summary of Findings.....	122

Topics Attended To When Watching a Volleyball Lesson.....	122
Knowledge Differences Associated with Training and Experience.....	124
Content Knowledge.....	126
General Pedagogical Knowledge.....	127
Pedagogical Content Knowledge.....	128
Sources of Influence.....	130
Role Models.....	130
Training.....	131
Experience.....	133
Reasons For Differences Among Participants.....	135
Context.....	135
Perspectives.....	138
Coaching Perspective.....	138
Teaching Perspective.....	139
Expert/Novice Knowledge.....	140
Implications.....	142
Teacher Education.....	142
Staff Development.....	144
Research.....	145

APPENDICES

A. BACKGROUND QUESTIONNAIRE.....	147
B. SESSION ONE INTERVIEW GUIDE.....	152
C. SESSION TWO INTERVIEW GUIDE.....	155
D. CONSENT FORM.....	158

BIBLIOGRAPHY.....	161
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LIST OF TABLES

	<u>Page</u>
1. Participant Key.....	49

CHAPTER I
INTRODUCTION

The process by which individuals learn to teach has been a topic of much debate both in and out of the education establishment. The National Center for Research on Teacher Education has called for a research agenda on learning to teach (1988) and legislative reform involving teacher education has been encouraged and initiated at both the national and state levels (Carnegie, 1986; Holmes, 1986; Joint Task Force on Teacher Preparation, 1987).

While many believe that the only preparation needed to become a good teacher is learning the subject matter and developing effective communication skills (Grossman, 1989), the reality of teacher development belies this simple thesis. Recent studies of teacher development show that acquiring expertise in teaching involves a variety of factors. These include mastery of several forms of knowledge in combination with appropriate opportunities to acquire teaching experience (Berliner, 1988; Shulman, 1986, 1987). Two areas that educational researchers have focused on in the study of teacher development are the knowledge base for teaching and the factors that influence knowledge acquisition.

Teaching Knowledge

Many who study teacher education have struggled with the question of what constitutes a knowledge base for teaching. Lately there has been a movement to broaden and

supplement the traditional viewpoint that regards teaching knowledge as a domain which cuts across all subject matter areas. Examples of such generic forms of knowledge typically included general pedagogical knowledge, knowledge of learners and their characteristics, and knowledge of educational contexts. In contrast, more recent models of the necessary knowledge base put greater emphasis on the notion that at least some of what teachers do, and thereby must know, is linked to the particular subject matter they teach. In his model of teaching knowledge Shulman (1986), for example, discusses three types of content knowledge: (a) subject matter knowledge, (b) pedagogical content knowledge, and (c) curricular knowledge.

While all three types of knowledge may be important to developing effective teaching practice, pedagogical content knowledge is perhaps the most critical. It represents the integration of subject matter knowledge and more general pedagogical principles. This synthesis of subject and method, in turn, constitutes a unique form of understanding which distinguishes a content specialist from a teacher (Shulman, 1987). Shulman defines pedagogical content knowledge as that aspect of subject matter knowledge that "embodies the aspects of content most germane to its teachability" (Shulman, 1986, p.9). In addition, this type of knowledge includes "an understanding of what makes the learning of specific topics easy or difficult" and a "knowledge of the strategies most likely to be fruitful in

reorganizing the understanding of learners" (Shulman, 1986, pp.9-10). This translates into transforming the knowledge teachers have into activities that are most beneficial to learning specific content. By the very nature of the definition, teaching practice drawn from pedagogical content knowledge will vary according to the topic being taught.

Developmental Influences

While it can be argued that there is an infinite number of life experiences which impinge upon and influence the growth of individuals as teachers, influences that are perceived to have a more direct impact may be grouped into the following developmental experiences:

1. Prior educational experience,
2. Formal teacher education,
3. Teaching experience.

Prior Educational Experience

Long ignored by teacher educators, prior educational experience, drawn from what Lortie (1975) calls the "apprenticeship of observation," influences one's values and beliefs if not one's whole conception about teaching. Although such unconsciously internalized norms may be one-dimensional or otherwise distorted, individuals enter teacher training programs with strong perceptions, and sometimes even stronger convictions, about teaching. Their beliefs are often shaped while they are students, and it is from that vantage point - not from a vacuum - that they approach their prospective occupation.

Formal Teacher Education

While occupying a relatively small amount of time in the total life-span of teacher development, preservice education programs represent a crossroads for teacher growth. Teacher education programs provide the opportunity to guide people through a necessary transition on their way to becoming teachers. This vital cognitive transition involves a change of thinking from the student point of view to the teacher's pedagogical perspective.

Ideally, the new and broader perspective adopted by trainees will allow distinctions about the work of teaching which were not apparent from the vantage point of the student role. Particularly, there should now be a clear recognition of the difference between those motions of teaching which include management and organizational teaching behaviors, and the foundational knowledge of teaching which includes what students should be learning (Feiman-Nemser & Buchman 1987).

Teaching Experience

Many have pointed to the act of teaching as having the greatest impact on lifelong teaching behaviors and practices. The heavy influence of socialization into routines and perspectives that are typical in most schools, for example, influences teachers in ways that perpetuate existing educational practices. In the closed loop of cause and effect, the experience of teaching shapes and limits the practice of teaching--which becomes the only available

experience. Even when an intervention intended to bring about a desired change is directed at teaching practice, the momentum of teaching as it is done often combines with the limiting influence of context variables to minimize the impact of that intervention (Glouidon, 1988).

In sum, learning to teach is far from simple. Because it involves a long, complex, and often subtle process, research must begin with basic questions about teaching knowledge and sources of influence in teacher development.

Statement of the Problem

To further our comprehension of the process by which individuals learn to teach, the first step is to investigate the broad range of general factors that influence the acquisition of teaching knowledge. A related, but more narrowly focused line of inquiry is to investigate the relative impact that formal training and teaching experience have on the acquisition of teaching knowledge. Toward this latter end participants for this study were drawn from physical education teachers who were both certified and uncertified and who had a wide range of teaching experience.

In order to address these issues the following sequence of research questions was developed:

1. What do trained and untrained physical education teachers attend to when they observe a physical education lesson?

2. What is the extent of variability in what is attended to by trained and untrained physical education

teachers when they observe a physical education lesson, and what is the nature of that variability?

3. To what sources do trained and untrained physical education teachers attribute the teaching knowledge displayed in their observations concerning a physical education lesson?

4. Are there differences in teaching knowledge, or sources of knowledge, which may be related to the presence or absence of teacher training in physical education?

5. Are there differences in teaching knowledge, or sources of knowledge, which may be related to the amount of teaching experience physical education teachers possess?

Definition of Terms

Trained Physical Education Teacher. An individual who has completed an undergraduate teacher education program and is certified to teach secondary physical education in the Commonwealth of Massachusetts.

Untrained Physical Education Teacher. An individual who is currently teaching, or has taught, a physical activity, but who has not received formal teacher education training and does not possess a teaching certification.

Teaching Knowledge. For the purposes of this study the definition of teaching knowledge has been expanded to include not only the traditional forms of knowledge associated with the term, i.e., general pedagogical

knowledge, but also the various forms of content knowledge outlined by Shulman, most notably pedagogical content knowledge.

Significance of the Study

This investigation is significant for the following reasons. By studying the development and origins of teaching knowledge associated with trained and untrained physical education teachers, teacher educators can gain a better understanding of the developmental process associated with learning to teach. Information of this sort would help in the design of experiences that might better address the needs of developing teachers.

Also, in the wake of the recent reform movement (Carnegie, 1986; Holmes 1986; Joint Task Force on Teacher Preparation, 1987), in which an increase in subject matter knowledge and a reduction in attention to pedagogy were common features, teacher educators have been left to examine the consequences of such shifts in emphasis. By examining the different types of knowledge that exist among trained and untrained physical education teachers, teacher educators can acquire a valuable basis for predicting the outcome of such changes in preservice preparation.

CHAPTER II

REVIEW OF LITERATURE

The importance and relevance of teacher education programs have often been questioned by those who hold the common perception that what teachers do is largely intuitive. If effective teaching is the result of strong subject matter knowledge, good communication skills, and high moral character, then training in pedagogy is superfluous. Why then, these critics ask, is it necessary for teachers to go through any formal teacher training?

To help answer this question, researchers in teacher education need to address the issue of how knowledge for teaching is acquired. Additionally, teacher educators must grapple with the elusive problem of establishing and defining a knowledge base for teaching. The body of this review is framed around four questions that arise from these issues.

1. How do teachers learn to teach?
2. Is experience the best teacher?
3. Is there a knowledge base for teaching?
4. What are the implications to be drawn from the research on learning to teach?

This review draws on literature from four areas:

(a) experiential learning, (b) theoretical frameworks relating to teacher knowledge growth and the knowledge base for teaching, (c) research reports on knowledge acquisition for preservice and inservice teachers, and (d) research

reports on knowledge acquisition for nonformally trained teachers.

Teacher Learning - How Do Teachers Learn to Teach?

A major determinant for this section was the proposition that a substantial amount of knowledge about teaching is gained through the experience of being a student and the resultant opportunity to observe teachers and teaching (Lortie, 1975). At some point most teachers go through a transition from a student perspective to the teacher's perspective of "pedagogical thinking". This latter stage is characterized by recognition of the difference between the motions of teaching, which include management and organizational teaching behaviors, and the foundational knowledge of teaching which includes knowing what students should be learning (Feiman-Nemser & Buchmann, 1987).

This transition can be further expanded to include more concrete stages of teacher development. In creating a developmental stage model for teaching that was drawn from research on the acquisition of expertise in teaching as well as other fields, Berliner (1989) has identified five distinct stages of teacher growth. They include (a) novice, (b) advanced beginner, (c) competent, (d) proficient, and (e) expert. Teachers at each stage exhibit varying degrees of teaching knowledge and competencies ranging from the mechanical replication of teaching routines displayed by

novices to the intuitive, seemingly effortless teaching skills exhibited by experts.

A key component of learning to teach is acquiring classroom observation skills. In describing what preservice physical education teachers observe and the perceptual processes used for such observations, Allison (1989) selected six participants and had them observe three fifteen minute sixth grade movement lessons. Her results showed that preservice physical education teachers focused primarily on students' movement responses followed by non-movement characteristics and organizational tasks and patterns. While these findings probably were linked closely to the fact that at the time of the study all the participants were taking a course in elementary movement that involved viewing videotaped lessons, it is nonetheless interesting that there were relatively few observations about the teacher or her teaching techniques.

One way to better understand how teachers learn is to examine the origins of teaching behaviors. In an attempt to do this, Clark, Smith, Newby, and Cook (1984) observed seventy-one first year teachers and categorized 1,346 novel teaching behaviors. The researchers then asked the teachers where they had learned each behavior. The results showed that approximately 33% of all the teachers responding credited their teaching behaviors to their "own ideas", 33% to some aspect of teacher education (coursework, student

teaching), and 33% to a "potpourri" of sources that included experiences outside of formal education.

The problem with asking teachers about the origins of their behavior is that their opinions may be influenced by the developmental stage they are at in the transition from student to teacher. Teachers possessing degrees of either student or teacher perspectives may, for example, credit their own behaviors to sources in a disproportionate manner. Rosenberg (1989), in his case studies of non-formally trained physical education teachers, found that participants often credited their teaching behaviors to "natural ability" to the exclusion of other possible sources.

In seeking to learn more about the influence of prior experience on the learning process for teaching, the National Center for Research on Teacher Education (NCRTE) at Michigan State University has called for a research agenda on teacher education and learning to teach (1988). Echoing Lortie (1975), the premise underlying the NCRTE studies is that prospective teachers enter teacher training programs with strong beliefs and well-formed perceptions about teaching.

To gain a better understanding of the beliefs and perceptions prospective teachers bring with them to professional preparation programs, the NCRTE has sponsored a broad longitudinal study that examines teacher training and the learning process in programs for preservice, induction,

inservice and alternate certification. The population consisted of 318 prospective elementary and secondary teachers of math and English from five university campuses. Forms of data collection were a questionnaire, an interview, and a guide for observing classroom teaching.

Preliminary results were reported in a series of papers presented at a symposium entitled "What do Prospective Teachers Bring With Them to Teacher Education?" at the American Educational Research Association conference in 1988 (Amarel & Feiman-Nemser, 1988; Ball, 1988; Gomez, 1988; Neufeld, 1988; Paine, 1988).

The findings begin to establish a connection between the influence of prior experience and how people learn to teach. While this influence has been acknowledged by teacher educators, it has seldom been studied in such great depth. Each of the five papers from the NCRTE study is briefly examined below.

In analyzing prospective teachers' beliefs about good writing, Gomez (1988) concluded that future teachers minimize the effects of context as a contributing factor to the quality of writing, but instead focus their attention on surface features of students' work. Gomez attributes this narrow conception of writing to the strong influence of prior school experiences. He calls on teacher educators to acknowledge prospective teachers' prior beliefs about good writing and to use coursework and field experience both to build on and challenge their beliefs.

In her examination of prospective teachers' understandings of mathematics, Ball (1988) concludes that most teacher candidates lack conceptual understanding of principles and connectedness. She uses the task of division of fractions as a focus for determining subject matter knowledge. Ball's findings indicate that prospective teachers go through the mathematical "motions" without ever understanding the underlying principles. While most possess a degree of mathematical proficiency, Ball argues that this ability to do it oneself is not sufficient to help someone else understand and do mathematics. To teach mathematics teachers must be able to explain meanings and reasons for certain relationships; they must be able to explain "why". Based on these baseline NCRTE results, Ball contends that as a specific consequence of limitations in their previous school experience, many teacher candidates are unprepared for the central task of teaching mathematics.

In analyzing prospective teachers' views and beliefs about teaching it was discovered that most future teachers believed that they would learn the most about how to teach from the experience of doing it (Amarel and Feiman-Nemser, 1988). In addition, it was found that there was a wide range of variability in how prospective teachers analyzed and learned from their experience. To illustrate this point, the researchers presented an in-depth comparison of the responses of two prospective teachers who formed distinctly contrasting views about teaching based on self-analysis of

their own educational experiences. These two cases were chosen out of the many participants because they represented distinctly different stages of teacher thinking. One did not perceive teaching as an active, reflective process, while the other was more aware of what her schooling offered her in terms of knowledge for teaching and was more able to distinguish the responsibilities of the learner from those of the teacher.

Another important component in the transition from student to teacher is how the issue of diversity is understood. The way prospective teachers view diversity is a consistent theme among all of the NCRTE reports. In Paine's (1988) analysis, for example, future teachers were found to have a limited conceptual understanding of diversity. Most linked the concept of diversity to the theme of fairness. Their approach to equity was to treat all students "equally". They were unsure of how to make concrete the abstract goals of equality for students through individualized treatment and often treated diversity itself as a problem rather than a universal phenomenon requiring adjustment. Paine concludes that these prospective teachers bring approaches to diversity which are "contradictory and have the potential for reproducing inequality" (p. 29), rather than establish real equity for their students. Those approaches, inadequate and dangerous as they may be, clearly had origins in the long apprenticeship of observation.

Still another indicator of what prospective teachers bring with them, and where they fall on the line of development from student to teacher, are their attitudes about the subject matter they are teaching and their role as teachers in presenting that subject matter. In examining the question of what prospective teachers think is important about the subjects they are preparing to teach, Neufeld (1988) found that these future teachers had difficulty identifying and articulating the importance or utility of their subject matter. In discussing their perceptions of the role of a teacher, these prospective teachers expressed doubts about a teacher's ability to influence student success. They did, however, express a degree of certainty that teachers could influence student failure. They also thought that their main job as a teacher would be to teach the subject by presenting material, as opposed to helping students to learn.

In sum, the preliminary NCRTE reports offer some interesting insights into the way experience shapes and limits the process of learning to teach. It would appear that prospective teachers are not just empty vessels waiting to be filled with knowledge about teaching, but are instead individuals with deeply imbedded ideas about teaching, many of which are counter-productive to the training process.

Addressing the question, "What do prospective teachers bring with them to teacher education?", is only the first phase of the NCRTE longitudinal project. These 318

prospective teachers will be studied throughout various stages of the teacher education process.

A useful extension of the NCRTE results is provided by Balaguer (1988) who examined the views and actions of preservice physical education teachers concerning student misbehavior. His findings indicate that preservice teachers primarily base their disciplinary actions on (a) their own memories as students or (b) former teachers' actions. Once again, the influence of prior experience played an important role not only in how teachers think, but how they act.

While a good deal of the evidence indicates that the impact of prior experience on teacher development can be distorting and misleading (Amarel & Feiman-Nemser, 1988; Ball, 1988; Gomez, 1988; Lortie, 1975; Neufeld, 1988; Paine, 1988; Rosenberg, 1988, 1989), a case can be made that not all experiences contribute to simplistic or misconceived views. At least one prospective teacher was able to grow and learn during a student teaching experience despite perceived lack of support and supervision, partially because she was a 32 year old woman who returned to college to complete her degree and become certified to teach English after a ten year hiatus (J.Shulman, 1987).

In this ethnographic study of the entire student teaching experience, Shulman addresses the question of why this woman was able to gain an "educative perspective" despite lack of support in a context that created pressures to conform to a far from ideal norm. She speculates that

her prospective teacher's "pedagogical inclinations" are in part a result of maturity and the various roles she had assumed in her life. These roles, which included being a mother, wife, counselor, and teacher's aide, gave her a source of self-confidence and experience with social interaction that helped resolve the role conflicts involved with student teaching. Pointing to the benefits of the various experiences accumulated by her participant, Shulman takes issue with Lortie and Feiman-Nemser when she asserts that not all prior experience "conserves the conventional and impedes change" (p.27).

In addition, it is presumptuous to assume that all perceptions drawn from the vantage point of a student must be discarded or restructured during formal teacher preparation. Buchmann (1989) makes a strong case for the notion that teaching and learning is an interactive process and that "common sense" knowledge gained through this process should not be summarily dismissed by teacher educators. While agreeing that prospective teachers enter formal training with strong ideas and beliefs about teaching, Buchman asserts that "not all the lessons of experience are invalid or deceptive as a preparation for teaching" (p.18). Regardless of its merit, knowledge gained through prior experience exists as a strong influence on the education of teachers and should not be overlooked by those who design teacher education programs.

In sum, the research indicates experiences that occur prior to formal training serve as an important source of knowledge for learning to teach. They also play a role in the development of teachers' views and beliefs about teaching. In addition, there is some evidence to show that knowledge and beliefs formed prior to formal teacher education directly influence subsequent teaching practice. While knowledge drawn exclusively from the experience of being a student often tends to be one-dimensional and distorted, there are forms of knowledge acquired from other experiences, such as being a parent, that can be beneficial to the teacher education process. Another experience which determines the passage from pupil to teacher is the actual process of teaching as a novice. The influence of this experience on learning to teach is discussed at length in the following section.

Experiential Learning - Is Experience the Best Teacher?

The common perception that subject competence and natural talent make a teacher has been proposed as formal doctrine by former Secretary of Education William Bennett (Grossman, 1989). He stated that all a teacher really needs in terms of preparation is extensive knowledge of the subject, good communication skills, and moral character. By implication it follows that the rest of what teachers do can be learned simply through the experience of teaching.

The idea that learning from experience is very important is believed by many prospective teachers who hold

that they would learn the most about how to teach from the experience of doing it (Amarel & Feiman-Nemser, 1988) and by novice teachers who point to their clinical experiences as one major source of knowledge about teaching (Clark, Smith, Newby, & Cook, 1985). Teachers consistently minimize the importance of their classroom experiences.

In stark contrast, one study appears to contradict the notion that most novice teachers give little credit to the teacher education they receive from classroom-based training. Using data collected from a larger study on knowledge growth in a profession, Grossman and Richert (1988) found that novice teachers credited both coursework and field experience as valuable in learning to teach. The knowledge for teaching gained through coursework that they identified as important included conceptions of the subject matter, ideals related to teaching, and pedagogical models. Teaching knowledge gained through fieldwork included classroom management, organizational skills, and awareness of student understanding and misunderstanding of the subject matter.

The idea that on-the-job training by itself is an effective teacher training technique is vigorously questioned by many who have studied teacher education. Buchmann and Schwille (1983) express skepticism about experiential learning alone by claiming that it can lead to faulty inferences about teaching, and that the reverence accorded learning-by-doing has historically been used to

suppress personal aspirations and restrict the freedom of new ideas. They believe that abstract knowledge from non-experiential sources not only clarifies what is real, but also provides a vision of what is possible. Formal teacher education gives access to thought and theories beyond the scope of firsthand experience.

Even within the context of teacher education programs, experientially based learning has its problems and limitations. Feiman-Nemser and Buchmann (1985) identify three "pitfalls" associated with experiential learning. The first is similar to Lortie's view on the limiting effects of prior schooling and is known as the pitfall of familiarity. The assumption here is that students are no strangers to classrooms and that many of their behaviors are influenced by preconceived, though not always correct, ideas drawn from their years in school. Because of their extensive exposure to classroom life many students enter the student teaching experience with the idea that they already know all there is to know about the complexities of education.

The second problem area with student teaching is known as the two worlds pitfall. In this case, recognition is given to the fact that teacher education occurs in two distinct settings, the training program and the clinical site, and that connections between the two are not always straightforward. The assumption is that prospective teachers will make the connections themselves, but this is often not the case. More often than not student teachers question the

relevance of their formal training prior to student teaching and discard what they consider to be dysfunctional, theoretical ideas for the more powerful influence of practices exhibited by veteran teachers in a classroom setting.

The third pitfall of student teaching relates to cross purposes. The presumption here is that classrooms are not set up for teaching teachers, but instead are designed to teach children. With this being the case, much of what can be learned about teaching is embedded in the day-to-day class routines. Experienced teachers, even when working with a student teacher, do not often stop to reflect, analyze, and discuss important teaching practices to the extent needed to create a meaningful learning experience for a beginning teacher.

Others have been critical of the most revered of all prior experiences, student teaching, because they think it emphasizes the development of management skills and is not sufficient in length or intensity for learning to teach content. Feiman-Nemser & Buchmann (1987) contend that the classroom setting does not offer a suitable environment for learning how to connect foundational knowledge of teaching to pedagogical thinking.

While some differences concerning the educational value of clinical experience persist, there is little doubt that more experienced teachers have a larger pool of information from which to draw when making decisions about teaching. In

a series of studies examining the acquisition of expertise in the teaching profession, novice and experienced teachers were shown slides and videotapes of science and mathematics lessons and asked to talk aloud and complete simulated teaching tasks (Carter, Cushing, Sabers, Stein & Berliner, 1988). Results indicated that experienced teachers were better able to attend to multiple, and sometimes simultaneous, events. In addition, experienced teachers were more capable of interpreting classroom phenomena. Novice teachers struggled to make sense of what they saw.

To shed more light on the differences that exist between expert and novice teachers, Livingston and Borko (1989) examined four student and cooperating teachers. The novice teachers in their study were all being certified to teach mathematics through a Masters level program and had not received undergraduate training in education. They were all chosen for the program on the basis of their strength in the content area they were going to teach. At the time of the investigation all the novice teachers were student teaching. The findings of the study support those of earlier ones that found distinct differences between novice and expert teachers. Novice teachers were less able to create and maintain plans in memory and relied much more heavily on a script, from which they deviated little. Experts, on the other hand, were better able to plan a lesson in their heads and adjust that outline to changing classroom situations as the plan was implemented.

In addition, the authors found differences between novice and expert teachers in the area of cognitive structure as it related to teaching. They found that novice teachers were less able to transform their knowledge of the content into effective teaching strategies and that knowledge of the content, combined with teaching experience alone, was not sufficient to develop this ability (Livingston & Borko, 1989).

Research studies which have focused on teachers who received no formal training indicate that experience, as the sole source of teacher growth and development, is at best a mixed blessing. Popham (1971a, 1971b) opened up a Pandora's box when his data appeared to confirm the disturbing notion that you could take individuals with subject matter expertise "off the street" and they could teach as effectively as certified teachers. Popham's conclusions indicated no significant differences in the learning outcomes for students taught by trained, certified teachers and untrained content specialists.

More recent studies, however, indicate that nonformally trained teachers have some large gaps in their understanding of teaching. These gaps might have become apparent in the Popham study if it had run longer and employed a more complex teaching context. For example, Grossman (1988, 1989) examined three first-year English teachers who had not received formal educational training. The primary purpose of her study was to understand more clearly the informal

sources of knowledge from which teachers draw as they learn to teach. Using a qualitative case study approach, data were collected in the form of in-depth interviews and observation of classes.

Not unexpectedly, Grossman found that prior educational experiences were the primary source of teaching knowledge. These included using college professors as role models. Results indicated that when ideas are drawn exclusively from such nonformal sources there is no certainty that teacher competencies will be developed. She found that teaching processes such as planning and class management are difficult to generate from recollections of experiences as a pupil.

In addition, Grossman's participants lacked pedagogical content knowledge. In many instances Grossman's teachers struggled to identify student needs in relation to specific subject matter and grew frustrated with students who did not grasp the material they presumed to be at the generic college comprehension level. Grossman concluded that while subject-matter knowledge, good character, and the inclination to teach are important characteristics of beginning teachers, they do not necessarily lead to a "pedagogical understanding of the subject matter nor to a theoretical understanding of how students learn a particular subject" (Grossman, 1989, p.207).

In another study that illustrated some of the gaps which exist in the knowledge base of nonformally trained

teachers, Carter, Sabers, Cushing, Pinnegar, and Berliner (1987) examined how expert, novice, and nonformally trained (referred to as "postulant") teachers processed and used information about students. Participants from each group, given the same hypothetical teaching task and resources, were instructed to design a forty-minute lesson. Postulants more readily accepted the validity of information provided about students and were less aware of potential problems and their connection to solution strategies. In addition postulants were less concerned about broader issues related to the curriculum and the organization of the class, and more concerned with the impact of their actions on individual students. They also were in a greater hurry to move on and teach what they believed needed to be taught, instead of assessing what had been learned.

In an indepth examination of a nonformally trained physical education instructor teaching volleyball in a university activities program, Rosenberg (1988) found that the instructor exhibited a number of misconceptions about teaching that included the idea that performance skill was the sole determinant of teaching ability and that simply playing in games was the most effective way to acquire volleyball skills. In addition, other gaps in the instructor's knowledge about teaching included his lack of reflection and ability to transform subject matter knowledge into appropriate learning activities. The instructor also had difficulty distinguishing his responsibilities from

those of his students. Rosenberg concluded that there was nothing to indicate that the instructor would develop adequate teaching skills so long as his only resource was prior experience.

Although some researchers are cautious about the value of practical experience to the learning process, few would argue that practical experience has the potential to be a very powerful learning tool. Its detractors argue, however, that clinical experiences are counter-productive unless they are carefully coordinated with a training and supervision program designed to help prospective teachers learn from the act of teaching (Clark, et al, 1984; Feiman-Nemser, 1983; Feiman-Nemser & Buchmann, 1985).

Those who support learning primarily through practical experience make three critical assumptions which may be falsely grounded. First, that clinical sites provide models of instruction that would be appropriate for use by novice teachers. Second, that the distinction between effective and ineffective teaching behaviors exhibited at the clinical site will be readily apparent to the beginner, and third, that novice teachers are capable of discerning and analyzing discrete teaching practices for the purpose of professional growth and development.

Some novices may indeed have the capacity to profit from unguided experience, but there certainly is no evidence to indicate that most do. On the contrary, the evidence indicates that the major areas of concern for novice

teachers, student control and class management, are so overwhelming as to blind the novice to all other aspects of their initial experience. Teaching the subject matter is a distant second to the more immediate concern of maintaining order in the classroom (Amarel & Feiman-Nemser, 1988; Grossman, 1988).

Teacher Knowledge - Is There a Knowledge Base for Teaching?

In 1975, Lortie was able to argue that no real technical knowledge base exists for teaching and that the profession suffers as a result. A decade later Feiman-Nemser and Floden (1986) observed that if there is no knowledge base for teaching then teacher education cannot transmit relevant professional knowledge. Practical, context-specific knowledge, while extremely important to the day-to-day survival of teachers, does not constitute a transferable knowledge base, the development and existence of which would help elevate teaching to the status of professions such as law and engineering.

Feiman-Nemser and Floden do believe that experienced teachers possess knowledge which reflects shared ways of thinking that set them apart from the general population. The question then becomes, what forms does this knowledge take and does it represent a contradiction to Lortie's gloomy assessment? Several recently constructed theoretical frameworks for examining teacher knowledge may allow a tentative answer.

Based on her case study work with one English teacher, Elbaz (1983) created five categories of practical knowledge for teaching:

1. knowledge of self,
2. knowledge of the milieu of teaching,
3. knowledge of the subject matter,
4. knowledge of curriculum development,
5. knowledge of instruction.

In describing the organization of this knowledge, Elbaz formulated three levels of teacher knowledge structure: rules of practice, practical principles, and images. A rule of practice is a situation specific teaching behavior. A practical principle is a broader concept that draws upon a teacher's ability to reflect. It takes into account a teacher's beliefs and knowledge about the relationship between a student's state of mind and learning. It applies to a variety of teaching practices ranging from unstructured interaction to preparing a student for an exam. Images reflect a teacher's knowledge on the most general level. They act as a guide to orient teachers' actions. They combine a teacher's feelings, values, needs and beliefs to create a picture of what teaching should be. These images then contribute to actual teaching practice when merged with a teacher's experience, theoretical knowledge, and the immediate school context.

One can surmise that factors influencing growth and development of the forms of practical knowledge codified by

Elbaz range from professional training to personal experiences and that different forms of practical knowledge may emanate from various sources. Further, it is not difficult to treat such information as a kind of knowledge base, albeit in tacit rather than explicit form.

In constructing a somewhat different theoretical model for looking at teacher knowledge, Lee Shulman (1986, 1987) addressed the issue of subject matter knowledge as a critical focal point for teachers' total knowledge base. While conceding that the recent teaching effectiveness studies have merit and have successfully linked patterns of teacher behavior to improved academic performance, Shulman (1986) is quick to point out that the teacher effectiveness studies have limitations as well. Such research seeks to identify generic teaching behaviors that can be linked to student outcomes as measured by standardized tests. Because of the methodological necessity for simplifying the complex world of teaching to meet the needs of scientific research, the critical feature of subject matter is intentionally ignored.

In the rich thickets of real classrooms, unexpurgated for the purposes of investigation, the subject matter is a dominating factor. Shulman (1986) considers the absence of the subject matter as a research focus to be the missing paradigm in the study of education. Central to his study of the knowledge growth in teaching is the notion of

transforming the subject matter knowledge of teachers into the content of instruction.

His model of the knowledge base for teaching focuses on four forms of content knowledge: (a) subject matter content knowledge, (b) general pedagogical knowledge, (c) pedagogical content knowledge, and (d) curricular knowledge. Content knowledge goes beyond the knowledge of isolated facts to include an integrated understanding of the subject matter as well as an understanding of its value and organizational structures. General pedagogical knowledge covers generic teaching practices common in a wide range of subjects such as student activity time and types of feedback. Pedagogical content knowledge refers to the understanding of the subject matter for teaching. It includes an awareness of various representations to make the subject matter comprehensible to others. It also includes an understanding of what makes the learning of a specific subject matter easy or difficult. Curricular knowledge is the awareness of the range of programs, materials and tools available to teach specific subjects. It also includes the ability to relate the subject matter being taught to other areas in a school's curriculum.

In a further elaboration of pedagogical content knowledge and its application to the subject area of physical education, Rovegno (1989) interviewed a preservice physical education major who was a college basketball player. While possessing a relatively high degree of

biomechanical knowledge about the skill of dribbling she struggled with teaching the dribble to unskilled children. She lacked the necessary knowledge about how children learned to dribble, how skill in dribbling was developed, and specific techniques for teaching dribbling that are linked to the ways children learn. In short she lacked pedagogical content knowledge.

Rovegno (1989) goes on to identify four sources associated with the development of pedagogical content knowledge. They are (a) field experience and field-based methods courses, (b) liberal arts subject matter courses, (c) non-field based content specific methods courses, and (d) courses on the psychology of learning theory.

In support of the notion that subject matter knowledge is critical to the development of expertise in teaching physical education, Siedentop and Elder (1989) contend that because a physical education teacher's formal training includes extensive coursework not directly related to what they will actually teach, i.e., history, philosophy, sociology and psychology of sport, the opportunity to obtain an indepth understanding and knowledge of sports and games is severely limited. In physical education those who obtain expertise are likely to have done so in specific activities and contexts. Indepth knowledge of the sport, usually gained through extensive participation or coaching, is combined with experience and pedagogical knowledge to form expertise. A suburban high school physical education

teacher, for example, may well be an expert when teaching tennis, but merely competent when teaching volleyball or tennis in an urban junior high setting.

Siedentop and Elder (1989) also discuss the differences between effective and expert teachers. On the basis of indepth analysis of seven effective physical education teachers, they conclude that the teachers interpret expertise in cognitive rather than performance ways. Experts are thought of as people who have strong theoretical knowledge and understand why things happen. This view is in stark contrast to the perception held by people in other fields (such as dance) who more closely link expertise to performance skill. The authors suggest that physical education teachers can be effective without necessarily being experienced. While admitting that more experienced teachers display an automaticity in their teaching styles that often makes what they do seem effortless, beginning teachers can with time and effort, produce similar results.

Shulman's framework for teacher knowledge gives credence to those like Feiman-Nemser and Elbaz who say that trained teachers possess a special knowledge that distinguishes them from nonformally trained content specialists. The challenge for teacher educators, then, is to create programs that are designed to educate teachers in these explicit forms of knowledge. This topic is the focus for the following section.

Teacher Education Programs - Implications

The existence of a knowledge base for teaching, the study of how teachers learn to teach, and the place in all this held by the direct experience of teaching, have critical implications for teacher education programs. Haberman (1984, 1985) contends that specific teaching behavior skills cannot be obtained through unsupervised experiences and a liberal arts education, but instead are acquired through a well-planned teacher education program.

By comparing trained and untrained teachers, Popham (1971a, 1971b) not only raised issues concerning experiential learning, but also caused many teacher educators to examine the whole issue of training program effectiveness. Although subsequently questioned on several methodological and theoretical points, Popham's research raised the nagging question of whether or not certified teachers can teach any better than untrained specialists. In the field of physical education, Locke (1984) ponders whether an expert badminton player who happened to be a cook or mechanic could teach a high school beginning badminton class as effectively as a graduate of physical education.

Haberman (1984) argues extensively and eloquently to defend the position that teachers receive specific knowledge in preservice teacher education programs. Citing numerous studies that contradict Popham's findings he grounds his belief on the teacher effectiveness literature which shows that student achievement can be linked to specific teaching

behaviors in the areas of active learning, classroom management and teacher expectations. Haberman (1985) goes on to say that common sense knowledge used by well intentioned, but untrained, teachers leads to behaviors that often are counterproductive to student learning because they don't take into account learner differences and knowledge of the school culture. He calls on teacher educators to reshape and upgrade programs to meet the new demands for reform of public education.

Others agree with Haberman and believe that teacher education programs have the potential to train and educate prospective teachers effectively, but that many fail to do so (Clark et al, 1984, 1985; Feiman-Nemser & Buchmann, 1985), and they echo Haberman's call to redesign rather than eliminate or scale down programs. Along these lines, Livingston and Borko (1989) propose that teacher education programs should be more explicitly designed to help prospective teachers maximize the opportunities to develop pedagogical reasoning skills. This includes program components that involve viewing and reading case studies of common classroom situations as a means of developing pedagogical awareness. They also suggest that an increase in pre-student teaching clinical experience, as well as the development of a program to train cooperating teachers to be teacher educators would go a long way toward meeting the needs of prospective teachers.

Clark, et al. (1984), in a somewhat less optimistic analysis, assert that current training programs merely expose future teachers to teaching competencies without developing proficiency. Their research confirms Lortie's assertion that a teacher's repertoire is developed over a lifetime as a student watching others teach, and that training programs, as presently constituted, merely prompt small adjustments and refinements in already present teaching styles.

The National Center for Research on Teacher Education (1988) supports the position that teacher education programs should more directly address the prior experiences of trainees. One conclusion drawn from their report is that prospective teachers must come to see teaching as more problematic, and more conceptually demanding than they do when they enter their programs. A strategy to accomplish this involves designing teacher training programs to help transform or build upon the conceptions prospective teachers hold so that they can fully benefit from both academic and clinical experiences (Amarel & Feiman-Nemser, 1988). The work done by Elbaz (1983) in developing categories of practical knowledge for teaching could help in the design of teacher education programs by offering a structure in which to offer specific coursework and experience.

The subject matter knowledge model put forth by Shulman (1986, 1987) also has significant implications for teacher education. By defining the subject matter as critical in the

teaching process, the necessity arises to create methods courses associated with specific subject matter. Programs must be designed to more closely integrate content and method components. For example, while prospective English teachers are learning about the contemporary American novel for their own understanding of the content, they should also be learning about ways of teaching the American novel to students who are at various levels of educational development. Prospective teachers should be made aware that how they learn at the college level is a vastly different process from how children learn. In broader terms, the content of what is taught must be understood within the context of pedagogical content knowledge.

In a sense, Shulman's (1986, 1987) model places a double burden on prospective teachers as compared to their liberal arts counterparts. Prospective English teachers must not only take the requisite number of literature and writing courses to gain their own understanding of the subject matter, but they must go beyond this understanding to acquire pedagogical content knowledge, that is, the knowledge of the subject as something to be taught to others. Elbaz's (1983) five categories of knowledge for teaching further highlight this dual structure of knowledge acquisition for teachers by explicitly detailing the specific knowledge teachers have that distinguishes them from other professionals.

Conclusion

In the last five years there has been a good deal of research about how teachers learn, the sources of teaching behavior, and the knowledge base for teaching. This research brings into clearer focus several points which many in teacher education may have known intuitively. First, most teachers go through a transition from being a student to becoming a teacher. This transition is marked by a change in perspective that results in an increased awareness of how people learn and an understanding of the role and responsibility of a teacher. Gaining a teacher's perspective appears to influence how teachers process and analyze the educational experiences they have had in the past.

Second, it is clear from the research that teachers draw from a multitude of sources when acquiring knowledge for learning to teach. One major source is the educational experience which teachers had prior to entering formal training programs. It appears that this source can both distort and oversimplify the teaching process (Lortie, 1975). Left unexamined, this raw substance of experience from the pupil's vantage point can be detrimental to the teacher education process.

Another source for knowledge about learning to teach is the act of teaching itself. Sometimes called on-the-job training, experiential learning has its drawbacks when it is the sole source for teaching knowledge. Teaching sites simply are not designed for teacher education and there are

many teaching practices that are not developed through either watching or doing. Even when incorporated into a teacher education program, clinical experiences pose potential problems. To be valuable learning experiences they must be carefully integrated into a program that stresses analysis and reflection.

Third, and finally, in terms of the knowledge base for teaching, research makes a compelling case for the notion that teaching knowledge not only should include generic teaching behaviors associated with class management and organization, but also should include the necessary knowledge to understand specific subject matter for teaching. This knowledge includes the ability to transform subject matter into representations for learning.

Given this promising start, what direction should research take in the area of learning to teach? There still is limited understanding about how nonformally trained teachers acquire teaching knowledge. Popham's curiosity about teaching effectiveness differences between trained and non-formally trained teachers could be expanded to address how these two groups develop as teachers and why differences exist in their growth. Instead of just measuring student outcomes, more qualitative studies could be done to help understand the critical moments and experiences that shape and influence the development of teachers. This is fertile ground for investigation that could help to shape teacher education programs in the future.

CHAPTER III

METHOD

The primary purpose of this study was to further understanding of how teaching knowledge for physical education is acquired. A secondary purpose was to investigate what, if any, teaching knowledge differences exist between trained and untrained physical education teachers who have varying amounts of teaching experience.

The primary source of data consisted of interviews conducted during and after eight participants watched a videotaped physical education lesson on the volleyball serve. The underlying premise of this form of data collection was that it addressed the research questions on two levels. First, by simply watching and talking about what was happening, information was gathered on what teachers attended to when they watched a physical education lesson. Second, information gathered from this first phase was then used to structure an individualized and detailed interview concerning teaching knowledge and the sources influencing the acquisition of this knowledge.

Results from earlier case studies of content specialists with no formal teacher training (Rosenberg, 1989) pointed to a wide disparity in teaching knowledge between the two participants. While providing a rich descriptive base from which to begin to form hypotheses on what may influence the acquisition of teaching knowledge,

these studies were limited by the small number of participants. The present study, on the other hand, while narrowing the research focus, both increased the number of participants and widened their background experiences.

Data Collection

Data for this study were collected in the following forms:

1. Background questionnaires,
2. Transcripts of audiotaped think-aloud viewing sessions,
3. Transcripts from audiotaped interviews.

Background Questionnaire

A personal history background questionnaire (Appendix A) was distributed to participants in order to obtain basic demographic information concerning age, gender, teacher training and teaching experience. Specific questions focused on previous sport participation, various forms of teaching (coaching, tutoring), and other roles and experiences that related to the development of teaching knowledge. The questionnaire was used to both screen individuals for participation and to develop background profiles for those selected.

Session One

To begin the session a full description of the research protocol was given to each participant. This included the following outline of what the participants were asked to do

- a) View videotaped physical education lesson for five-minute orientation,
- b) View full lesson and accompany with oral description,
- c) View full lesson second time and answer probing questions,
- d) After viewing is complete, answer additional probe questions relating to comments on the lesson and suggestions for change.

After reading the description of the research protocol, each participant watched the first five minutes of the videotape as a means of orienting them to the viewing process. During this orientation participants were told simply to relax and watch the lesson without obligation to comment. Next, during the first full viewing participants were asked to think aloud and give a running description of what they saw (see Appendix B - session one interview guide). During this viewing the tape ran uninterruptedly. During the second viewing, the tape was stopped at points identified by the participant as particularly interesting or important. At each of these points the participant was asked to explain what they perceived to be significant. Each participant also was asked to evaluate and explain why each episode they identified was effective or ineffective in terms of teaching and learning. After the viewing was completed, probe questions were asked that related to what they as teachers would change or keep the same.

Session Two

To gain insight into the teaching knowledge that existed among the participants, as well as the sources that influenced acquisition of that knowledge, a second formal interview was arranged. Prior to this interview participants received transcripts of their comments given during the first viewings. Drawing on observations and comments made during the first session as a starting point, the focus of the second interview centered on each participant's development as a teacher. The interview included specific questions designed to elicit information related to the research questions (see Appendix C - session two interview guide).

Participants

After preliminary screening, four members from each of the following two groups were asked to volunteer. A final total of eight teachers participated.

Formally Trained Physical Education Teachers

Criteria for selection into this group was completion of an undergraduate teacher education program in physical education and a teaching certification for secondary physical education in the Commonwealth of Massachusetts. Participants from this group also had to have volleyball teaching experience. They were chosen from a pool of cooperating teachers involved in the Professional Preparation Program at the University of Massachusetts in Amherst.

Untrained Physical Education Teachers

Participants from this group had no formal teacher education background and did not possess a teaching certification. Criteria for selection included volleyball playing and teaching experience. Individuals were drawn from volleyball instructors in the General Physical Education (GPE) program at the University of Massachusetts and physical education faculty members at private secondary schools in Western Massachusetts.

In order to insure diversity in teaching experience among the participants, two members from each group had less than two years of teaching experience. A full protocol for informed consent was used and the participants' identities were kept confidential (see Appendix D - consent form).

Access

To gain access to participants, permission to request their participation was obtained from the directors of both the GPE program and Professional Preparation program in Physical Education at the University of Massachusetts. Content specialists and undergraduate majors were approached individually. Experienced secondary physical education teachers were contacted by phone or letter. In all cases the researcher introduced himself and outlined the nature of the research. When respondents agreed to participate a first meeting date was scheduled.

Videotaped Lesson

A twenty-minute videotape was made of a college physical education volleyball class. The class members consisted of undergraduate physical education majors. The teacher was a member of the Athletic Department at the University of Massachusetts and served as the women's volleyball coach.

She completed an undergraduate teacher education program and was a certified physical education teacher. The topic for the class was the overhand floater serve. Selection of the tape was based on both the variety and frequency of teaching practices. The twenty-minute videotape was edited from an hour and fifteen minute lesson and includes clear examples of the following:

- | | |
|---------------------------|-----------------------|
| 1) introduction/warm-up, | 8) Teacher-student |
| 2) lecture/demonstration, | interaction in |
| 3) learning activities, | individual, small |
| 4) closure, | group and whole group |
| 5) performance, | formats, |
| 6) feedback, analysis | 9) successful and |
| and correction, | unsuccessful practice |
| 7) student on and off | trials. |
| task behaviors, | |

Data Analysis

Based on several piloted procedures that yielded some sample data from which to work, the following two-stage method for data analysis was developed. After the initial

talk-aloud session was transcribed, responses and comments were grouped into categories of teacher behavior and student response that were repeatedly noticed. Examples of themes included class management, teacher feedback, and student practice. Data categories in each grouping were then used to structure a second interview. Each participant was asked to discuss how in their own teaching they handled the problems and decisions represented in each category. They were then asked to reflect back on how they acquired and developed skills and knowledge related to that pattern of teaching behavior. Throughout, specific questions designed to draw out teaching knowledge were asked (see Appendix C - session two question guide).

After the second session interviews were transcribed, categories were created to address the three major areas of study. They were topics attended, knowledge differences, and influences on teacher development. Within each category the data were coded into specific classifications. Using Ethnograph, a computer data management system, comments of the participants were then grouped for the purpose of analyzing similarities and differences. In addition, the background questionnaires were used to develop individual biographical profiles of each participant.

Pedagogical Content Knowledge

For the purposes of this study, Shulman's definition of pedagogical content knowledge was further refined and adapted to fit the subject area of physical education. In

the context of teaching, possessing pedagogical content knowledge allows teachers to transform their knowledge of the subject matter into learning activities that are appropriate to the level of the learner. Teachers are then able to effectively communicate their subject matter knowledge to others. When teaching the serve in volleyball, for example, a teacher with pedagogical content knowledge would have to combine a knowledge of biomechanically correct technique, knowledge of the learner and common errors associated with learning the serve, with a knowledge of appropriate tasks for each developmental stage of the learning process.

In order to apply pedagogical content knowledge it is necessary to be aware of certain teaching principles and practices associated with skill acquisition. They include:

- 1) Proper technique,
- 2) Common performance errors,
- 3) Correction procedures,
- 4) Learning progression,
- 5) Developmental levels,
- 6) Appropriate practice activities.

These components were used as the criteria by which pedagogical content knowledge was assessed. Data pertaining to them were drawn from both phases of the collection process.

Research Issues

This study is limited, in part, by the particular procedures used to collect data. The limitations of the methodology described by Berliner (1988) in similar studies of teacher knowledge growth pertain to this one as well. The artificial environment created to study these teachers, as well as the small number of participants made unqualified generalization impossible. Moreover, no attempt was made to select participants on the basis of their effectiveness as teachers. Finally, what teachers notice when they watch a videotaped lesson may not predict how they will actually teach. Nevertheless, identifying what teachers attended to and considered important when they watched a lesson is a critical first step toward understanding how they develop the cognitive awareness necessary to acquire effective teaching skills. An explicit assumption was that teachers talk about what they know and that in turn this knowledge forms the basis with which they develop their behaviors as teachers.

CHAPTER IV

BIOGRAPHICAL PROFILES

The following descriptions and participant key (see Table I) for the eight teachers in this study are presented to help provide context for the data.

Novice, Untrained Subject Matter Specialists

1. Mary is a 21 year old undergraduate senior majoring in communications. Articulate and outgoing, Mary exuded confidence when talking about the sport of volleyball, but was visibly less secure when discussing the act of teaching it. True to her area of study, Mary believed that the use of language, what she called "volleyball jargon", was an important aspect of teaching.

At the time of the study Mary was teaching a college General Physical Education (GPE) volleyball I class. It represented her first teaching experience. She was hired to teach on the basis of her playing history which included four years as a starter on her high school volleyball team, two years of collegiate club participation and one year of college varsity experience. She had been the captain of her collegiate club team and received the most valuable player award in 1989. In addition, Mary had also played on her high school basketball and softball teams.

Table 1. Participant Key

	Untrained/Uncertified Subject Matter Teachers		Trained/Certified P.E. Teachers	
Novice	1		1	
	1	1. Mary	1	1. Tammy
	1		1	
	1	2. John	1	2. Dan
	1		1	
Experienced	1		1	
	1	1. Celia	1	1. Kim
	1		1	
	1	2. Vic	1	2. Bob
	1		1	

<u>Name</u>	<u>Age</u>	<u>Years Teaching</u>	<u>Education</u>	<u>Major</u>
Mary	21	1	Undergraduate Senior	Communication
John	20	3	Undergraduate Junior	Business
Celia	21	5	Undergraduate Senior	Journalism
Vic	38	17	B.S. M.A.	Chemistry
Tammy	26	3	B.S.	Physical Education
Dan	26	2	B.S.	Physical Education
Kim	39	18	B.S. M.A.	Physical Education
Bob	45	23	B.S.	Physical Education

Mary's beliefs about learning to teach were encapsulated in the following statement:

I like teaching. Especially when you're teaching something that you know very well. I imagine professors of academic courses have no problems teaching a class because they've been doing it for so many years it seems like second nature to them.

In addition to volleyball, Mary is involved in weight training on a regular basis. Neither of her parents is athletic. Her brother plays basketball and football and wrestles. Prior to the GPE volleyball class Mary had never worked in a teaching capacity, with adults or children nor had she ever received any formal teacher training.

2. John is a tall 20 year old undergraduate junior who majors in marketing. Friendly and self-assured, John believes he learned more about teaching from his work experience in his father's youth soccer camp than he had from previous experience teaching volleyball. John views successful teaching as a process that involves developing class management skills. In his words:

Giving good succinct directions, that's the main thing I learned through coaching (in youth soccer camp). You've got to be able to snap your fingers so that people line up - get them going double time.

When interviewed, John was teaching a college GPE volleyball II class. He had previously taught volleyball for two and a half years in the GPE program and had been hired on the basis of his playing experience which he admitted was "not all that extensive." He began playing volleyball seriously as a first year college student by

taking a beginning GPE class and has played on club and intramural teams.

His background in soccer was much deeper. He had been on the U/Mass men's soccer team and had played soccer since his first year in high school. He was chosen to teach volleyball, in part, because of that sport's popularity and the resultant need for volleyball instructors. He would have preferred to teach soccer. It is a mark of his versatility that in high school John had also been on his varsity basketball team. Moreover, he's currently active in mountain biking and skiing.

John's father played soccer and basketball in college and he now administers a summer youth soccer camp. While not enrolled in any formal teacher-training program, John had worked as a counselor in his father's camp for four years where he taught and coached soccer to children at a variety of skill levels. The extent of his college teaching experience was encompassed in the two and one half year period during which he had taught volleyball in the GPE program.

Experienced, Untrained Subject Matter Specialists

3. Celia is an outgoing 21 old undergraduate senior majoring in journalism. Celia had made the Dean's List every semester and maintained a 3.92 grade point average. For five years before this study was undertaken, Celia had been involved in teaching and coaching volleyball in various settings. These included the GPE program, YMCA

recreational leagues, intramural collegiate teams, and a United States Volleyball Association (USVBA) league.

At the time of the study Celia was coaching and playing for a United States Volleyball Association team and teaching a beginning volleyball I class in the GPE program. Celia had been hired to teach in the GPE program on the basis of her competitive playing experience. Having been the captain of her high school varsity team she continued to play throughout her college years. At the time of the study she was a member of a sanctioned club team and had received several honors and awards for her playing.

Celia believes she has learned a great deal about teaching by doing it. She recognizes the difference between learning environments associated with athletic teams and those inherent in class situations:

I've found from my own teaching experience that it's very easy, when you're in a non-competitive situation, and you're not holding a varsity practice, to get people frustrated and discouraged. In a class, people have to learn to enjoy the game, and doing lots of drills will dampen their interest rather quickly.

Apart from volleyball, Celia has participated on a recreational basis in the following sports: racquetball, skiing, weight training, and bicycling. Both her parents, as well as her brother, were active in several sports. Celia has served as an intramural volleyball supervisor and despite her five years of experience has received no formal training in teaching or coaching.

4. Vic is a slightly built, 38 year old uncertified science teacher with thinning brown hair. Thoughtful and

analytical, Vic presents himself in a restrained and formal manner. He teaches at a large private preparatory high school in Western New England. He graduated from an Ivy League college with a Masters degree in chemistry. His responsibilities include teaching volleyball and coaching the boys high school volleyball team, which is what he was doing when he became a subject for this research. Vic had been teaching and coaching volleyball at the school for ten years.

He was deemed the resident volleyball "expert" and chosen to teach and coach at his preparatory school on the basis of his playing experience and his passion for the game. For over ten years, dating back to his college days, Vic had participated competitively in volleyball at a variety of levels. In college he was an intramural and club player; most recently he was a member of a United States Volleyball Association club team. Vic credits much of what he has learned about teaching secondary students to his experience as a teacher of chemistry in the classroom. He points to his use of that generic knowledge when he teaches and coaches volleyball. Hence, an experienced teacher, Vic is familiar with a multiplicity of issues related to effective teaching. In one analysis he discusses two approaches to teaching volleyball:

There's this big dichotomy in teaching volleyball between using skill progressions on the one hand or going in and just having them perform it and realize that they have to motivate themselves to come and get help if there's a certain thing they're not doing right.

Besides teaching volleyball and chemistry, Vic has served as his school's golf coach. He also participated in organized track and soccer programs in high school and college and now plays softball and golf on a recreational basis. His father had been a high school basketball player and his sister had played golf and tennis. In college, Vic served as a dormitory athletic coordinator and organized volleyball tournaments. Over the years he had attended several volleyball coaching clinics, but received no other formal teacher training (for either sports or academic subjects).

Novice, Certified Secondary Physical Education Teachers

5. Tammy is a slender, 26 year old brunette. She is a certified K-12 physical education teacher who stays fit by participating in karate on a regular basis. At the time of the study she was substitute teaching and looking for a full time teaching position. She had majored in physical education and received her B.S. degree in 1987. Since her graduation she has served as a substitute physical education teacher in a variety of schools and has taught a unit of volleyball to middle school students.

A self-described "humanistic educator", Tammy believes firmly that a primary goal of physical education is to help students develop a positive self-image through sport and movement. She thus feels that the role of a teacher should

include more than simply presenting the subject matter. As she puts it:

I think that you're a teacher first and what you teach is very secondary. Who cares if you can't make a serve over the net? I'd rather build up a student's confidence first.

Aside from volleyball Tammy has taught a number of sports, among them gymnastics, karate, badminton, softball, and aerobic dance. She also served one year as a high school varsity gymnastics coach.

In high school, Tammy was a member of her gymnastics team of which she was the captain in her senior year. In college she was active in the karate club. Her mother played organized field hockey and basketball and her father played basketball and baseball. Her brother is active in baseball, soccer and skiing and two sisters take part in gymnastics, cross country running, volleyball, and skiing.

In addition to teaching, Tammy had been the director of a summer gymnastics clinic. Aside from her formal undergraduate training, she has not attended any sports related clinics or seminars.

6. Dan is a good natured 26 year old high school physical education teacher. He majored in physical education and received his B.S. two years prior to the study. At the time he was interviewed, Dan was completing his first year as a full-time certified physical education teacher in a Western Massachusetts public high school. Dan also is a trained and experienced emergency medical technician.

During his two years as a high school teacher Dan taught several units of volleyball. He ascribes much of his teaching knowledge to experiences he has had as an undergraduate physical education student, but admits that he still feels more comfortable teaching activities that he has participated in extensively as an athlete:

The sports I can teach well are the ones that I've played. I know them better just from my own years of doing them.

Dan has taught high school units not only in volleyball but in tennis, karate, and aerobic dance. During his first year as a teacher, Dan coached the boy's junior varsity basketball team and served as an instructor and coach for basketball, football, and baseball teams in a youth sports program. He has recently attended a number of sports and coaching clinics.

As a child Dan played Little League baseball; later, in high school, he was active in its baseball, basketball, and football programs. In baseball he was twice selected for an all-star team, and was a league leader in batting average and home runs. In college, Dan participated in intramural/club competition in softball and karate. Neither of Dan's parents was ever active in organized sports. His brother played soccer in high school and the Air Force.

Experienced, Certified Secondary Physical

Education Teachers

7. Kim is a fit looking 39 year old certified physical education teacher with short brown hair. She received her

Bachelors degree in physical education eighteen years prior to the study, and during that time has taught physical education at a public high school in western Massachusetts. Kim recently completed work on a Masters degree in physical education.

Kim taught units in volleyball virtually every year of her teaching career and was a member of her college varsity volleyball team. She continues to play club volleyball regularly. Quick, and very direct, Kim has a "no nonsense" air about her. She is very concerned about budget cutbacks and the impact they will have on programs like hers. While acknowledging that knowing the subject matter is important to effective teaching, she places greater emphasis for teachers on recognizing appropriate learning levels and providing activities that awaken students' motivation:

More important than understanding the sport (being taught) is teaching to the level that the students are at. If students don't enjoy the activity they are learning they probably won't pursue it and get better at it.

In addition to volleyball Karen has taught a wide range of activities during her high school teaching career. They include basketball, outdoor education, gymnastics, aerobic dance, archery, and self-defense. She also coached field hockey, basketball, softball, and track and field.

While in college Kim participated at the intercollegiate varsity level in the following sports: field hockey, basketball, track and field, and softball. She continues to play club basketball. She was a member of

several championship teams and was captain of her college field hockey team. Prior to college she did not participate frequently in organized sports. In addition to team sports, Kim regularly runs and skies.

Neither of Kim's parents participated in sports. She has two brothers who have been active in baseball, basketball and golf. In addition to teaching physical education, Kim was a camp counselor at a YMCA for one summer and worked in a summer recreation program for two years. She also served as physical education department head in her school for fifteen years. Besides the formal coursework associated with attaining her two degrees in physical education, Kim has attended a number of field hockey and softball summer clinics.

8. Bob is a trim 45 year old physical education teacher. Certified to teach K-12, he has taught physical education in elementary, junior, and senior high school settings for over twenty years. He majored in physical education and graduated with a B.S. degree twenty-three years before this study. At the time of his interview he was completing work toward a Masters degree in Physical Education and was serving as the Director of Physical Education and Athletics in his school district. A sport entrepreneur, Bob ran his own gymnastics school and served as a supervisor of water safety for the Cape Cod National Seashore.

Bob had taught units of volleyball in public high schools for eleven years. Perceptive and analytical, Bob possess a great deal of experiential knowledge that he has been able to refine and develop through coursework in his Masters program. As a cooperating teacher, he is particularly pleased to mentor young student teachers. Bob believes that he has learned a great deal about teaching by his considerable experience in doing it. He believes that trial-and-error is helpful, but only if the need for improvement and self-analysis, with its special skills, are fully recognized:

Teaching skills for me have been a developmental thing over a long period of time. They evolve according to an individual's ability to evaluate oneself. I've noticed teachers in the last twenty-two years who look but don't see themselves. They don't self-evaluate. They just go through the motions of teaching.

Bob has taught many sports in high school including basketball, gymnastics, softball, soccer, swimming, and track and field. He has also coached gymnastics, baseball, basketball, and swimming.

Bob was a starter on his high school baseball, basketball, and wrestling teams. He was a member of his college swim team and also participated in intramural softball. Since college he has continued his involvement in basketball, skeet and trap shooting, and track and field events. Neither of his parents devoted their time to organized sports or athletics. Bob's brother is a tennis player and baseball coach.

Beyond the training that went with his degrees in physical education, Bob has attended clinics in gymnastics, swimming, and basketball plus physical education staff development workshops.

CHAPTER V

RESULTS

The results of this study have been arranged in the following manner:

- A. Topics attended to and the variability of what was noticed when watching a physical education lesson.
- B. Knowledge differences related to training and experience.
- C. Influences on teacher development

Topics Attended To And The Variability of What Was Noticed When Watching a Physical Education Lesson

The data and analysis for the first two research questions have been organized as follows. All references to what the participants were attending to when they observed a videotaped physical education volleyball lesson were sorted into eight non-overlapping categories. These categories were created from general patterns that emerged when reading the transcripts of the first interviews.

The categories are

1. Lecture
2. Use of time
3. Teacher monitoring
4. Teacher feedback
5. Learners
6. Subject matter
7. Representation of subject matter

8. Class Management

While there were many similarities among trained and untrained teachers in what was attended to in the initial viewing of the lesson, differences arose in both the frequency of remarks made about the various areas, and the extent and depth of elaboration and interpretation. Both areas of similarity and the extent of variability in what was noticed are addressed in the discussion of each category below.

Five of the participants chose to critically evaluate the lesson in terms of the flaws in instruction they believed had occurred. One commented in neutral descriptive terms and two others spoke primarily about positive aspects of the class. This phenomenon may have had several causes. First, while special care was given to allow the teachers to comment freely on the lesson (see Appendix B - Session One Interview Guide) perhaps an unintended message was transmitted that gave participants a signal that critical evaluation was expected.

There is, however, a second and more compelling explanation. The tendency of teachers to attend to what they do not like or would not do in lessons they observe may be the result of the set with which they approach the task. The act of observing a peer tends strongly to be associated with critique and the consequent purpose of improvement. Disinterested analysis of a colleague's performance, particularly if the lesson is in the observer's own area of

competence, is the exception rather than the rule among teachers. For most, the goal of analytical reflection is to identify aspects of teaching that did not result in an optimum learning experience. While identifying and reaffirming positive teaching actions may well be beneficial, it simply is not where many teachers begin. Detecting and (it is tacitly assumed) improving deficiencies, is the common set when teachers watch teaching.

Lecture

This category represents comments made about the teacher's verbal presentation of the subject matter of volleyball. This usually took place while the class was seated and the teacher was speaking, but it also occurred during activity when the instructor would stop the action and address the entire class.

Regarding the lecture, virtually all of these participants believed the volleyball teacher transmitted an excessive amount of information about the topic of the day, the floater serve. Tammy (trained, novice) remarked:

I think it's too much information. I would give them just one or two simple things to think about first.

Vic (untrained, experienced) concurred:

There were just lots of little things that she kept talking about. I wasn't sure whether those were worth doing because it's hard to tell how the audience is absorbing it.

Participants from all the groups were concerned that the teacher's terms might not be understood by her students.

Mary, an untrained novice, referred to much of the teacher's speech as "volleyball jargon". And Kim (trained, experienced) noted:

From what I see of the skill in the class, she (the teacher) was being very, very technical.

Celia (untrained, experienced) identified one instance of possible confusion.

I thought the students were a little confused as to what a floater serve exactly was. She (the teacher) mentions it, but it would be better if she defined it as a ball that is wiggly.

Vic noted that "serve" and "receive" might be "undefined things" of which students were unaware.

While there was general concern among trained and untrained teachers about the amount of information being transmitted, the untrained teachers were more likely to pinpoint particular terms as sources of confusion.

This seemed to reflect the fact that their more extensive volleyball playing experience made them more sensitive to the precise meaning of the sport's technical language.

Use of Time

This category involves comments made about how time was used in the class in relation to student activity. The focus is on teacher behaviors that affected the amount of time students spent passively waiting or actively practicing.

One corollary of the common perception that the lecture contained excessive information was that respondents from all the groups believed that too much time was consumed

in sitting and listening and not enough time was given to practicing.

After viewing an extended period of student inactivity, John (untrained, novice) commented about his own class:

They wouldn't have sat. They would have been active in anything we do. One purpose of a drill is to have everybody active.

Another untrained teacher, Vic, also was sensitive to how time was spent in relation to sitting and practicing:

Rather wordy (lecture). I think the students would prefer to do something rather than listening to her talk.

Bob (trained, experienced) teacher agreed:

I would have been itchy to get going. She (the teacher) should refine her presentation skills to communicate what she wants.

In an interesting aside, Bob theorized that if given the opportunity to view the lesson, the teacher also would notice the amount of time she spent talking while her students were inactive. When, in fact, the instructor viewed the lesson she did comment that too much information had been given and that she had spent an excessive amount of time lecturing. In fairness to the instructor, it must be remembered that portions of the lesson containing student activity had been edited from the videotape used in the study.

In addition to being aware of how time was spent, all the teachers, with the exception of the two untrained novices, gave explanations for why maintaining a high proportion of practice time was important to learning.

Celia stated:

When you're trying to teach a sport to a bunch of people who have never played before, I think it's really important that everybody has a lot of time to practice the skill. If you're waiting in a line to serve, you might be getting one out of six chances and then it's kind of tough to improve.

Dan (trained, novice) supported the view that high activity time gained through practice is important to the development of a physical skill:

I don't like to stop for everything I have to say. Keep them moving, keep the lesson going. They can still listen while they're doing it. That way they don't lose the practice time.

Dan continued:

With sports the more active you are the more you learn. But she is talking too much. For seven minutes here. I'm sure the students forgot everything she said after one or two minutes.

Experienced teachers also tended to be the most critical about the use of time. Bob: "I'd like to see more practice time." Kim: "The students only received three practice tries." To some, the lesson appeared monotonous. Vic was the most emphatic in his criticism, calling the use of student time "pathetic".

Teacher Monitoring

This category includes the participants' reaction to the teaching behavior of observing both individual students and the class as a whole. It involves the physical positioning, movement patterns, and silent observations used by the teacher during her lesson.

In regard to monitoring, there was a distinct difference in the frequency of comments made by trained and untrained teachers. This is a matter of selective attention and inattention. Untrained teachers gave no indication that they were aware of monitoring as a specific teaching practice. Trained teachers, on the other hand, took frequent notice of how the teacher positioned herself, how she watched students, and how she circulated around the class. Typical of this was an exclamation by Tammy (trained, novice) while she viewed the class warm-up period:

She [the teacher] is not looking at what they're doing. She's looking at her book. I would be giving feedback about running or about something. I wouldn't just be looking at my book.

Later Tammy continued:

She had them [the students] where they mostly could be in view at all times. Even when she was talking to just one person, she could easily look up and see where the rest of them were.

She's always staying on this side of the gym. She hasn't been on the other side at all.

Dan, another trained novice, was similarly aware of how the teacher monitored her class:

She notices what everyone individually is doing. She stands back and watches the whole class rather than being in the middle with her back turned to one side.

She goes around to the whole class. [But] she's paying a lot more attention to that far side too.

Bob (trained, experienced) also noticed that the teacher did not move around the whole gym:

She gives instruction to the kids around her but she doesn't make an effort to move to the whole class or to the other side of the class.

Bob:

Is she going to move? Is she going to do something here? I'd like to see her move to the other side of the net to help the kids over there.

While untrained teachers noted other teaching behaviors, there was a noticeable absence of comments related to the monitoring of student actions. This may in part be attributable to the fact that untrained teachers simply assumed such behavior was standard teaching procedure and did not regard it as significant enough to discuss. It is more likely, however, that they simply were unaware of this generic element in teaching practice. Much of their experience had been as coaches or players in highly skilled, small group settings where both the need to monitor and its actual practice differed greatly from that of a teacher faced with a large class of heterogeneous students.

Teacher Feedback

This category includes comments made in reference to the teacher's verbal response to student actions. Types of feedback noticed include general and specific comments pertaining to both skill and behavior.

Concerning feedback, all the participants in this study did notice and comment on this teaching behavior. While both trained and untrained teachers noticed the teacher verbally communicating with students, trained teachers often made finer discriminations.

Tammy (trained, novice) commented:

Most of her feedback is related to skill. I didn't hear much about behavior except that one time. She doesn't give a lot of positive feedback. She does a lot of corrective stuff.

Kim (trained, experienced) also was able to identify a type of feedback when she heard the teacher in the lesson tell something to a student:

A quick little "good" [statement] was made. That was very unspecific feedback.

Later Kim noted

It did not seem at all as if she [the teacher] was really making any comments at all to the class as a whole, or even individually except to one or two students.

Bob (trained, experienced) would like to have seen the teacher give more feedback and suggested:

If she was getting a feel for what most of the students were doing maybe she could have stopped the class and given the whole group some specific feedback.

In addition to identifying different forms of feedback, trained teachers were better able to talk explicitly about why they believed feedback was important to effective teaching. Tammy (trained, novice) noted that the teacher did not give much positive feedback. She believed the teacher should have given more recognition and reinforcement to things students were doing correctly instead of simply providing corrective feedback. She goes on to explain why, in her opinion, this matter was serious:

People's self-concept is tied into how they feel about themselves physically. So if they're constantly getting "this doesn't work" "this isn't right" "you need to work on this", their whole image

goes down the tubes. And then they hate this, they hate you, they hate volleyball. After that they'll never learn the skill.

This ability on the part of trained teachers to elaborate on the importance of feedback supports the findings of Berliner (1988) who discovered that trained and more experienced teachers were better able than untrained subject matter specialists to elaborate on and interpret the meaning of observed teaching behaviors.

Another difference in this study between trained and untrained teachers was that trained teachers exclusively used the word feedback, while untrained teachers used other words to identify the same teaching action. Mary (untrained, novice) referred to positive feedback as "encouragement": After viewing the teacher reinforce a successful student practice attempt in a supportive manner Mary commented:

Encouragement is important. I think a lot of times she [the teacher] will joke around a bit or try to be at their level as well as being their instructor, and that is important.

Encouragement is important whether you're teaching a course in a gym or teaching a course in the classroom. In general it keeps peoples attitudes high.

Vic (untrained, experienced) also used other terms to identify feedback. Once again, after the teacher made a supportive remark to a student, Vic commented:

Pretty good positiveness. She seems encouraging and engaging in the sport.

This is not a trivial semantic distinction. Trained teachers could more explicitly detail the relationship between various forms of feedback and teaching objectives.

The use of "feedback" rather than any other designation was not simply a lapse into educational jargon. It represented a technical understanding of a construct that enabled its user to go beyond mere labeling of an action. An example of this is illustrated in the contrasting comments made by Tammy (trained, novice) and Mary (untrained, novice). Tammy was asked to elaborate on feedback and its relationship to the learning process:

I think feedback is extremely important because how else will students know how they're doing? A teacher can provide verbal feedback or set up an activity so that students can receive self-feedback and measure their own progress. Without it [feedback] students are not going to go anywhere. It would be an accident if they performed skills correctly and even then it wouldn't be reinforced.

The following exchange occurred when Mary was asked to explain why she thought "encouragement" was important in an educational setting:

Mary: I think with anything encouragement is important

Int: Why do you think encouragement is important in a volleyball class?

Mary: Because encouragement in general is something that keeps people's attitudes high and their spirits in tune with learning.

Int: And why is that important to learning volleyball?

Mary: When you encourage people it keeps them from getting frustrated when they can't do it the first time. It helps, you know, make them feel more competent. Less uncoordinated.

While Mary appears to be talking about general positive feedback and Tammy more specific corrective feedback, the difference in the two levels of understanding is distinct. Through her explanation, Tammy displayed an understanding of

feedback that explicitly focused on the relationship between the teaching act and skill acquisition. While certainly not incorrect, Mary's view of "encouragement" revealed a lack of awareness about its specific function in an educational context.

The perceptions of Mary and Tammy reflected the sources from which they drew their knowledge about teaching. Mary was influenced by a formal training program where she had been introduced to the concept of feedback, and Tammy attributed her understanding of encouragement to life experiences. These and other sources of influence on teaching knowledge will be discussed later in the chapter.

Learners

This category encompasses respondents' comments about students in the class. Topics of discussion include student behaviors, interaction patterns, and actions that contributed to the class atmosphere.

Once again, all the teachers in this study commented to some extent on the learners and their behaviors. There were, however, clear differences between trained and untrained teachers. Trained teachers were much more aware of students' on-task and off-task behavior. Dan (trained, novice) remarked early on in the lesson while watching the warm-up:

I wouldn't have people running around with the ball. You see, they're getting a bit off by just dribbling and bouncing the ball. People are rather nonchalant.

Later Dan continued:

Everybody's on-task, everyone has a ball. On the last demonstration I noticed the people were not really watching, paying attention.

Bob (trained, experienced) also commented on student behavior early in the lesson:

The students are supposed to be stretching now, but a few of them have shot baskets and are still bouncing the ball instead of putting them in the basket.

While untrained teachers did notice some off-task behaviors, such as bouncing the balls during the warm-up period, the vast majority of their comments focused on the performance of the skill and correct and incorrect technique.

John (untrained, novice) commented:

You've got kids doing the baseball move, the way they're throwing it here, instead of extending their arms.

Later John noted:

Her body position is wrong. She's not facing the net. She's facing the side and coming through across her body. See her feet. They're not pointed straight. She comes across her body and gets off balance.

Celia (untrained, experienced) was also sensitive to correct skill technique:

I think she (the teacher) should be paying more attention to the kids. I see a couple of them pushing from the shoulder.

After watching one student perform the serve Celia commented:

A lot of people try to serve standing still. They try to use just their upper body and it's just so much easier if you step into it. Just good technique.

Both Celia and John also were acutely aware of the number of times students foot faulted. This infraction of the rules was commented on only by untrained teachers and appeared to reflect the competitive game context in which they have been exposed to learning and teaching volleyball.

Trained teachers deal with a wide range of student behavior. Awareness of potentially disruptive actions in the classroom constitutes a major teaching responsibility and is necessary to maintain class control. This is partly traceable to the large classes they teach, and another objective factor, namely that their students are conscripts rather than volunteers.

The untrained teachers in this study, on the other hand, do not teach physical education in secondary school settings. Three of them teach volleyball on the college level to students who are taking the activity on an elective basis. To them, student behavior and class control are not major considerations. Also, the untrained teachers have been exposed to learning volleyball in an athletic team situation where much attention is given to refined skill technique and where behavior, again, is not a significant issue because athletes voluntarily attend practice.

In addition to behavior and skill technique, all the participants commented on the class atmosphere. Virtually all the teachers noticed that the enthusiasm and energy level

of the students was low. This from Vic (untrained, experienced):

It's just a rather quiet, dead class. You've got only about twelve people and a lot of what they're doing here is clearly boring people.

And from Bill (trained, experienced):

They [the students] are casual. I'd like to see them a little more motivated. I'm sure they would become enthusiastic if they got into game situations.

There was general agreement that the low energy level of the class was due to the length of time spent on the serve and the lack of variety in the learning activities.

Dan (trained, novice) commented:

Some of the students were very lackadaisical. At the end of the class they started to drift a bit. An hour spent on the serve gets kind of old anyway.

Vic (trained, experienced) agreed:

To spend the whole lesson, so many minutes, on serving is absolutely deadly. High school or college, you've got to have a little more than this.

On a related topic, virtually everyone noticed that the teacher tried to create an interactive environment for the students by asking them questions. A difference, however, arose between trained and untrained teachers in the interpretation of why so few students in the class responded. Some of the trained teachers believed that the questions were too broad and open-ended and implicitly rhetorical in nature.

Tammy (trained, novice) supported this view:

She [the teacher] asked if anybody has any questions. Sometimes you can get bombarded with questions or nobody wants to say anything. It's easier to

have them try it and then ask "What did you notice when you did this? What did you notice when you snapped your wrist? Which works better?" It makes the students think about the skill.

Later on Tammy noted:

At the end of the lesson she [the teacher] asked if there were any questions. Nobody asked a question. She wasn't specific enough. She didn't ask them anything about what they had done in the lesson that day. I'm not sure if she really wanted any questions.

Mary (untrained, novice) had an alternate opinion:

An instructor should ask questions because the teacher was probably thorough enough in explaining that particular skill. They would have asked a question if they had one. I think they understood everything.

Once again, the contexts in which Tammy and Mary have taught and learned volleyball may well influence the nature of their comments. Tammy's experience has been that of teaching children who may be taking volleyball as a requirement and are more than likely at the beginning level. Her students do not have a base of knowledge about volleyball from which to ask specific questions. For Tammy, questions are used by the teacher to assess student attention and understanding. In order to elicit questions from her students Tammy has to go beyond a general solicitation for questions to framing her request in specific terms.

Mary, on the other hand, has been exposed to volleyball players who are intrinsically motivated to play and probably have a much greater depth of knowledge about the sport. Mary, herself, falls into this category. As is the case with her own most recent learning experience as a highly skilled player on a team, she may assume that the students in a class

will know enough and take the responsibility to ask questions. From Mary's perspective, if students do not ask questions, it must mean that they understand the skill and therefore have no questions.

Subject Matter

This category focuses on participant comments about the subject matter of volleyball, specifically the floater serve, as well as the warm-up activities of running and stretching.

There was a sharp distinction between trained and untrained teachers in the detail of discussion relating to the floater serve, yet similarities existed among all eight teachers in comments made about warm-up activities.

Untrained teachers, novice and experienced, were much more explicit and analytical in their discussion of the floater serve than their trained counterparts.

Vic (untrained, experienced) commenting on the serve stated:

It's kinetic energy we're talking about.
It doesn't matter how your hand hits the ball as long as it has the mass it has. If your hand's velocity goes faster then you're going to hit the ball further. Stepping into the ball is just a way to get the hand to go faster at the end.

Celia (untrained, experienced) also analyzed an aspect of the floater serve:

I've noticed that there are different types of floater serves. I have a friend who throws the ball twenty feet into the air, other people prefer a low toss. I myself prefer a toss that's about two and half feet high.

John (untrained, novice) contended that:

The floater is a hard serve to hit. You have to snap and just stop your wrist and the ball is supposed to knuckle. I can't even hit one well.

Trained teachers rarely engaged in specific analysis of the floater serve itself. Comments about the serve usually were subordinate to observations about more general aspects of teacher or student behavior. Here is Kim (trained, experienced), while she watched students practice a lead-up activity to the serve:

As the kids are throwing back and forth instructions are given [by the teacher] on what they should be doing with transfer of weight and the proper arm motion.

Bill (trained, experienced) after watching the teacher demonstrate the floater serve, noted:

As an instructor she's well skilled with the skills for the serve.

In short, the untrained teachers talked extensively about the floater serve in a context-free manner. In contrast, trained teachers attended very little to performance of the floater serve itself, but instead talked about the skill in relation to the problems of teaching and learning. This pattern invites two different interpretations. First, and most simply, the teachers in this study may have talked more extensively about what they knew best. Untrained teachers discussed the floater serve because they specialized in volleyball and had been exposed, through clinics and a competitive background, to more detailed analysis of such skills as the floater serve.

Trained teachers, on the other hand, have neither specialized in volleyball nor had the need to develop an advanced analytical understanding of the sport.

A second interpretation suggests a more subtle source for the differences in trained and untrained teachers' attention to the subject matter. It may be that those with formal preparation are inclined to disregard much of the specific detail of student performance - because they regard it as relatively less important than other aspects of student behavior. For some, this disposition may be part of an instructional strategy in which the small details are ignored in favor of attention to broad patterns during the initial phase of skill acquisition. For others, however, the absence of attention to particular elements of performance may reflect a far greater emphasis on student compliance and engagement. When keeping students busy and good is the name of success, the progressive shaping of motor skill across practice trials is not a central concern.

All eight participants noticed and commented on the warm-up component of the lesson. The warm-up consisted of a short run around the gymnasium and a free stretching period during which students were directed to stretch individually. Almost all the teachers were critical of the warm-up. Most believed the running to be unnecessary and unrelated to what was being taught that day. They also noticed that the students were holding volleyballs while they ran and that this led to off-task behavior and discipline problems.

Bob (trained, experienced) asked:

Is jogging an appropriate warm-up for a volleyball class? I would think that if they're going to be doing a warm-up for volleyball that the warm-up should include the kinds of activities that would be appropriate to a volleyball class.

John (untrained, novice) agreed:

I don't like the warm-up. The warm-up has nothing to do with volleyball.

Mary (untrained, novice) commented while the students were running:

Maybe she shouldn't have let them use the volleyballs quite yet until the lesson actually starts.

John was also critical of the stretching:

These guys [the students] are stretching their legs, the calves and their groin. The girl way in the back there is just swinging her arms around and she didn't do any legs. In volleyball you concentrate on your upper body more than your legs but the legs are important.

Some teachers noted that the stretches were being done individually on the part of the students. Kim (experienced, trained) commented:

The stretching is not led. They're doing their own stretching by themselves. Some of them are just walking around and not stretching. There's no instruction given at all.

Mary (untrained, novice) added:

I think there should be one or two people leading the stretching just so there's a sense of everybody stretching out the right parts.

As noted above, most of the participants were in agreement that the warm-up component of the lesson was flawed. Experienced and novice teachers from the trained and

untrained groups believed that the warm-up should be more closely linked to volleyball and that to ensure proper stretching the stretches should be led. In this instance their varied backgrounds and contexts did not appear to shape either attention or opinion in distinctive ways. Diverse experiences may sometimes teach the same lesson.

Interestingly, after viewing the lesson, Carol, the teacher, voiced many of the same concerns about her own teaching performance. She criticized herself for allowing the students to run while carrying balls and also was puzzled at why the stretches were not led. She theorized that because the lesson had occurred fairly early in the semester she had not fully established a class routine. Also, she noted that her volleyball team players warmed up individually, after having learned appropriate stretches, and that she may have acted reflexively in allowing the students in her class to do the same.

Representation of the Subject Matter

This category included all the comments on how volleyball skills were presented to students. Topics include teaching methods and learning activities. This category is closely linked to a key element of teacher understanding that Shulman (1988) calls pedagogical content knowledge.

As was the case with the floater serve, there also were distinct differences between trained and untrained teachers on what constituted "correct technique" and how to allow for individual differences when teaching a volleyball skill.

Although they were not entirely consistent, the untrained teachers in this study were inclined to believe that there were a variety of correct techniques to achieve a floater serve and that teachers shouldn't necessarily impose one "right" way of doing it. This view was articulated by Celia (untrained, experienced) when she talked about the correct toss for a serve:

I think that a lot of people have a different serving style, some people perform better on a high toss than a low toss. Basically, whatever is a good toss I believe, is whatever feels comfortable and gets the job done.

Mary (untrained novice) supported this notion:

Some players may feel when they start to do the actual serve that maybe they don't have to bring their arm up as much or they want to slow down a little bit. They shouldn't feel they have to do it this way or it's totally wrong.

Vic (untrained, experienced) commented:

The serve is not an area in which certain individualities couldn't be tolerated.

It is important to note that whereas all three of these untrained teachers appeared to support the idea that there is no absolutely correct technique for executing a successful floater serve, all three did allow that there were generally correct principles and that individual differences which deviate from these principles might not produce desirable results. Celia:

With a beginning class it may be good to give them parameters (on correct serving techniques).

Later she criticized a student's serving technique:

There's no way you can do a good serve with a closed fist. I think she [the teacher] should try and get them to use the open hand more.

Mary:

I think there is a most efficient way of doing a particular skill.

Vic:

There are areas where it would be hard to tolerate individual quirks.

Trained teachers did not raise the issue of individual technique differences. This does not necessarily indicate a negative disposition toward individual differences in skill technique. What it does point to is the difference in experiences and contexts to which these two groups of teachers have been exposed. The untrained teachers who specialize in volleyball have been in environments where individual differences in skill technique exhibited by advanced volleyball players were not only tolerated but probably supported. Players who persisted with their own non-standard technique were, by definition, producing the desired result. Trained teachers, on the other hand, deal with students who are less skilled and have had relatively little exposure to volleyball. To them, recognizing and encouraging individual differences is not an issue. The more pressing concern is that of introducing fundamentally correct skill technique.

What remains unclear is whether teachers without training can process and make the necessary adjustments from

the highly skilled environment of an athletic team to the radically different context of a group composed of beginning students. Grossman (1988) found this adjustment to be very difficult among untrained high school English teachers who drew information about teaching solely from their experience in college classes.

All eight participants noticed and made comments on aspects of how the subject matter was presented to students. Unlike the warm-up, however, there was no common agreement among the teachers as to the appropriateness of the activities nor were there any discernible patterns among these participants' comments. Some of the teachers were aware of and addressed themselves to the progression of activities leading up to the floater serve. There was, however, some disagreement about the effectiveness of the progressions in terms of skill acquisition. Vic (trained, experienced) viewing an early activity, commented:

A typical progression into a skill kind of thing. Which is not bad. There are all sorts of arguments about whether you should bother with this or not.

Vic went on to elaborate:

Because I haven't been satisfied with the acquisition of skills under those methods (skill progression activities), I've been leaning toward trying to make the person do something at the top level and then patching what they don't do naturally.

Dan (trained, novice) was also aware of the progression of the activities. While watching an early throwing activity he tells us that:

They're throwing the ball and she [the teacher] makes them use the same form, [which] basically you would use if you were serving it. They'll move quicker through this progression to the goal of serving because it's so close to what they're actually going to do.

Later Dan noticed a flaw in the progression:

She [the teacher] is talking about things in the wrong order. I would just do one thing at a time and make it very sequential. I would do the toss first and not even talk about hitting the ball. After they've got the toss then I would say the next thing we're going to do is the point of contact.

Tammy (trained, novice) agreed:

She started with the contact and then went into the toss. And actually, the toss is the first thing that you do. I would just have them toss for a while and then talk about what you do after you have a good toss.

John (untrained, novice) perceived a problem with the progression:

Her [the teacher's] techniques weren't in order. She mentioned the toss way after she had the kids tossing the ball.

Another aspect of the learning activities that some of the teachers singled out turned on the amount of practice time allowed for each drill. Celia (untrained, experienced) commented:

This seems to be a good drill. [But] I'm not sure it's warranted in the first serving lesson, especially since these people have just learned the skill and now have to wait their turn while doing it.

Later Celia talked less ambivalently about an activity:

It's a good idea to break people up into pairs, with a ball apiece, because that way they have more time with the ball.

Bob (trained, experienced) agreed:

She [the teacher] has enough balls for one per two students. They did get a lot of practices with the serve.

Mary (untrained, novice) liked the way the teacher integrated the rules of the game into a learning activity:

That's good the way she [the teacher] did that. It's important to comment on any regulations for the actual sport and incorporate it in the drills.

Celia concurred:

I like the way she [the teacher] is working in the rules of the game along with the drill instead of making them separate. People will tend to remember them better that way.

In sum, all eight teachers were keenly aware of how the subject matter was presented in the form of learning activities. Their comments ranged from simple statements of fact to approval and disapproval. Several of the novice teachers indicated that they had never seen a particular activity and might incorporate it into their own classes. Still forming their repertoire of teaching skill, any opportunity to observe instruction serves for them as a much-needed form of subject-specific teacher development. The significance of their reaction is underscored by recent findings indicating that novice teachers lack specific knowledge about tasks for students that are related to the subject they are teaching (Berliner, 1988).

Most of the observations made about the learning activities were not linked to participants' background in any obvious fashion. This may indicate that, as is the case in other disciplines, differing views about how to present subject matter to students emerge from complex and highly personal beliefs about learning.

Class Management

This category concentrates on those aspects of the lesson that relate to management of students and the structure of the class. Topics of discussion include taking attendance, class control, student grouping, equipment and space concerns, and organization of activities.

There was a definite difference between trained and untrained teachers in their remarks about attendance and class control. Trained teachers were alert to which procedures were used in taking attendance as the students ran and warmed up. Kim (trained, experienced) commented:

That's a very efficient way if you know the kids and who they are. That way they're doing something with their bodies while she's doing her managerial skills.

Bob (trained, experienced) teacher agreed:

She [the teacher] did some efficient things such as take attendance while they were doing their warm-up.

Dan (trained, novice) likewise noticed how the instructor took attendance:

It is a good time to be taking attendance. They [the students] are doing something. It's better than taking the time to wait and just call off [names] while the kids do nothing.

In contrast, none of the untrained teachers commented on the attendance taking procedure.

Class control was another area that trained teachers focused on more than their untrained counterparts.

Bob (trained, experienced) stated:

She's got good control. The kids respond well to her instructions in terms of where they're supposed to go and the kinds of management skills that she needs to accomplish with them.

Dan also noted class control issues:

She generally keeps everybody on task. She could, on some of the showing of the points, make sure they're all watching. She could have stepped back a few steps and told them all to look.

Class control was second topic on which untrained teachers rarely dwelled.

Both trained and untrained teachers noticed how students were grouped during lecture and demonstration periods.

Mary (untrained, novice) noted:

I think that's good that she [the teacher] got everybody in a circle when she talked. That way she has eye to eye contact with everybody.

Dan (trained, novice) was also conscious of how students were arranged when the teacher spoke:

If she is going to talk she should have the students move closer. There are some kids straggling way off to the side, out of her sight.

Later:

Again, while she is talking she should keep people in front of her so they're watching.

Kim (trained, experienced) noticed one student who was removed from the rest of the group:

Since the whole group was around her she should have actually pointed him out and asked him to join the group so that he could see and hear better.

Teachers from all the groups commented on the activities and how they were organized. In discussing how students should be arranged during the specific activity of learning the volleyball boundaries, Tammy, a trained novice disagreed with the teaching technique that she was watching and explained her own approach:

I might have one person go and stand on this side and another person go stand on that line and another person stand on the other line. Or I might have walked the whole group through it. A physical orientation to it.

Celia (untrained, experienced) noted that some of the activities in the lesson had students waiting in lines while others had them grouped in pairs which resulted in higher activity time:

It's good to break people up into twos with a ball apiece because that way they have more time with a ball.

Lines tend to get confusing and people don't always get a turn. You just don't get as much out of it.

Dan (trained, novice) saw it the same way:

Everybody and their partner has a ball, which keeps everyone hitting the ball. That's a lot better than if there was a line and everybody went up, hit the ball, and got at the end of the line.

Several of the untrained teachers reacted to the lack of variety among the activities offered during the class. Celia (untrained, experienced) was critical:

I think it would be more beneficial to do drills half of the time and play or scrimmage half the time. People enjoy the game if they can play. Just doing drills tends to dampen their interest.

John (untrained, novice) also commented on the lack of variety:

You've got to change the drill every five minutes. Sometimes it has to be fun. For every boring drill you have to have two fun drills. She should have incorporated a game. All they did was serve all day. My arm would fall off.

When watching the lesson, the teacher, Cathy, believed she should have restructured the activities to include more "challenging" aspects. She noted a lack of enthusiasm and suggested that instead of just serving she could have had the students aim at designated areas and keep track of successful trials.

All eight teachers noticed and remarked, rather enviously, on the equipment and facility the teacher had at her disposal. Vic (untrained, experienced):

It's good that they at least have enough balls to have one per person. That's not true of the classes I teach.

They have enough balls and enough space. The nets are much nicer too. It looks like a good building to work in.

Dan (trained, novice):

She has enough volleyballs and space and she uses them, which is good. [Where I am] we only have one net for too many people and a lack of volleyballs.

This universal appreciation for the resources available to the teacher of the lesson indicates that this factor transcends differences in teaching and contexts.

In summary, trained teachers in this study paid more attention than untrained teachers to the methods employed to take attendance and maintain class control. Members of both groups were aware of student grouping and organization of activities, and equipment and facilities. This pattern may reflect the nature of the contexts these teachers work in and in which they have been associated with volleyball. Taking attendance and maintaining class control are generic teacher actions that physical education teachers perform everyday in their schools. While certainly not unknown to the untrained teachers, these actions may not assume the same degree of importance in the contexts in which they teach. Three of the untrained participants teach in an elective college program. In addition, teaching actions such as taking attendance and class control behaviors were probably not major factors associated with playing on, and/or coaching athletic teams. Student grouping, equipment, space concerns, and organization of activities were related to both coaching volleyball in an athletic setting and teaching volleyball in a physical education class and thus drew comments from both trained and untrained teachers.

The influence of teaching context on what these teachers noticed, and their perceptions of teaching, will be discussed in greater detail in Chapter VI.

Knowledge Differences Associated with Training and Experience

Three categories of teaching knowledge, drawn from Shulman's (1987) knowledge base model, will be used to examine the differences in knowledge among the eight participants in this study. They are content knowledge, general pedagogical knowledge, and pedagogical content knowledge.

Content Knowledge

This category encompasses specific knowledge associated with the sport of volleyball and the perceived relationship of this knowledge to the act of teaching. As noted earlier, the untrained teachers in this study talked about the subject of the lesson, the floater serve, in much greater analytical detail than trained teachers. This pattern continued when participants were probed in greater depth about the extent of their volleyball knowledge.

Untrained teachers talked comfortably about very specific aspects of the sport as Celia, illustrated:

The reason a ball floats when you hit a floater serve is because it's got this detached bladder inside that vibrates back and forth with the air. The floater serve basically makes the air vibrate in a certain way when you hit it in a certain spot.

Vic also discussed the serve in some depth:

A floater is a good serve to learn because it doesn't have any spin. Among good receivers of serve, if there is any kind of spin on the ball it becomes predictable and thus easier to receive.

When probed for content knowledge, trained physical education teachers spoke about volleyball in a less detailed manner. They talked about aspects of the sport that were more generalizable to other activities such as weight transfer and proper arm extension. For example, Bob explained:

As in every sport, it's important to stress the basic mechanics. With the [volleyball] serve you have to transfer your weight from the back foot to the front foot, have good arm speed, and make sure the ball is in front of you.

Kim touched upon some of the same themes:

With this skill [volleyball serve] transfer of weight and the proper arm motion are very important. You need to do them to help generate the necessary power to get the ball over the net.

The difference in the extent of volleyball knowledge between trained and untrained teachers probably is traceable in large measure to the fact that volleyball is virtually the only sport that the untrained participants teach. They can focus more on subtle details of the sport because that is all they are expected to know and teach. Furthermore, all the untrained teachers in this study are active volleyball players. They are recent recipients of coaching that probably included detailed skill analysis. This accumulated experience as competitive volleyball players contributed significantly to their content knowledge base.

On the other hand, only one of the trained physical education teachers in this study was a competitive volleyball player. By the very nature of their jobs, trained physical

education teachers are sports generalists. They are required to be familiar with the content knowledge associated with a variety of sports. They often do not have the time or the desire to learn a particular sport extensively. In addition, they often must teach different sport activities to the same students. In the interests of continuity and expediency, it seems logical that they would look for and emphasize generic motor patterns common to the different sports that they teach.

In a related area, each participant was asked to evaluate the importance of content knowledge to the skills needed to be an effective teacher. Once again there was a pronounced difference between trained and untrained teachers in how they perceived the importance of content knowledge. Untrained teachers believed strongly that extensive knowledge of volleyball was the most important aspect in being able to teach it successfully. One common view among the untrained teachers was that content knowledge, particularly if it was gained through extensive performance, contributed to one's credibility as a teacher. Mary explained:

Knowing the subject really well helps establish a teacher's credibility. It affects her believability. Students have faith that she knows what she's doing and that in turn has an impact on her ability to teach students.

John agreed:

Knowing the subject is very important because it helps get the respect of your students. If you don't sound like you know what you're doing, then they are never going to respect you.

Vic added:

Knowing the subject well is going to affect the way in which the student is going to view you. The more detail you know, the more you can be of value to someone.

Although all four untrained participants were in agreement about the primary importance of content knowledge to teaching, the two more experienced teachers recognized that while this form of knowledge was necessary, it was not the only factor that contributed to competent teaching.

Celia explained:

I've known people who have been average players and didn't really know all that much about volleyball. But they do know what the proper execution is, safety issues, and the rules and I think that's adequate to teach.

Vic, another experienced teacher, went further:

When you teach to the highest skill levels, I think there is a direct correlation between how much you know and your ability to teach. On a lower level I don't think the correlation is that great. Enthusiasm is a pretty important part, and you can have that without knowing everything there is about the sport.

In contrast, trained physical education teachers de-emphasized the relationship between extensive content knowledge and successful teaching. While most admitted that some knowledge of the sport was necessary, the consensus view was that knowing the sport well and being able to teach it effectively were not closely linked. Tammy talked to this point:

I don't think knowing the subject really well is that important. I think that you are a teacher first and then what you teach is very secondary.

I think you need to stay ahead of the students, and you need to be well prepared.

Dan agreed:

It's nice to know the sport really well, but I don't think it's drastically important. You don't have to have excelled in that sport all your life to teach it. There are some sports that I've never played that I've been told I've taught very well just through doing things I picked up when I learned to teach - using teaching styles and that stuff.

The clear difference between trained and untrained teachers in the perceived importance of knowing the content knowledge would appear to be a function of both the variable teaching contexts these participants work in and the uneven knowledge bases they have to draw on when they think about teaching. The untrained participants in this study teach or coach students who have had some volleyball playing experience. In most cases they work with upper level or advanced classes. They teach aspects of volleyball that go beyond basic skills. To them a sophisticated understanding of the sport and the ability to identify and analyze advanced skills would constitute the primary form of necessary knowledge to teach.

The emphasis placed by untrained teachers on the relationship between content knowledge and teacher credibility may also be correlative with the presumption that their students have a knowledge of the sport with which they can judge teacher expertise. Trained physical education teachers, on the other hand, teach volleyball classes that generally are introductory in nature. Their teaching goal

involves students acquiring fundamental volleyball skills. They view their content knowledge as sufficient to accomplish this goal. One has to wonder, however, whether some of these teachers who assert that they can effectively teach subjects they do not know very well regard effective teaching of the content and efficient class management as one and the same.

The difference between these two groups of teachers in the perceived importance of knowing the content may also be a reflection of the varying experiences which influenced the knowledge base on which they draw in their teaching. For untrained teachers in this study, the exclusive source of information about the content of volleyball derived from a good deal of participation in competitive settings and considerable exposure to coaching. In these situations sophisticated and subtle aspects of volleyball were emphasized. In addition, content knowledge represented the only form of knowledge to which these teachers had been formally introduced. Lacking exposure to other forms of teaching knowledge, it is not surprising that the untrained teachers regarded content knowledge as critically important.

By contrast, the trained physical education teachers did not have much volleyball playing experience. For most of these teachers, content knowledge in volleyball had been acquired through taking one college level course on the subject. They had, however, all gone through formal teacher training programs that involved extensive exposure to non-content specific forms of teaching knowledge. It follows

then that they would minimize the importance of a content knowledge to which they had only been superficially exposed and emphasize the areas of knowledge they were aware of through training and experience.

General Pedagogical Knowledge

Shulman describes this area of knowledge as one characterized by "broad principles and strategies of classroom management and organization that appear to transcend subject matter" (1987, p.8). This category of knowledge also includes general teaching principles such as establishing the learning environment, structuring practice time and determining logical progression of tasks.

Once again, there were sharp differences between trained and untrained teachers regarding their depth of general pedagogical knowledge. As noted earlier, participants from both groups commented on such general principles as student activity time and the disadvantage of long lines. But when they were probed, trained teachers exhibited a far greater range of knowledge in a variety of generic teaching practices. Bob discussed some of these:

Teachers need to understand how to set up a group, how to set up skill progressions, how to set up practice time - they need to know how to work with kids. They need to be able to generate enthusiasm for a particular sport and be able to create a positive climate within the classroom.

The importance of creating a positive learning environment was also set forth by Kim:

It's important that a teacher create a climate in which the kids are going to feel welcome and relaxed. Students need to know that it's okay

if they make a mistake and that if they have something to say, they can say it without fear of the teacher or someone else coming down hard on them. They should have a good feeling about coming to class as opposed to feeling they are there because they have to be.

In contrast, untrained teachers had difficulty identifying and talking about teaching knowledge and skills that were not in some way tied to the subject matter of volleyball. Novice, untrained teachers in particular struggled when talking about non-content related teaching topics. When asked directly if she thought that an elite volleyball player needed any other skills beyond performance ability to teach effectively, Mary replied:

Not really. They (elite players) know so much more about the sport. They've progressed to where most people would like to be. They were once beginners themselves and understand what it takes to learn it.

After some reflection Mary qualified this view:

Suppose someone were a really great player but had a real bad attitude on the court. I guess that might affect their ability to teach - they may not be as organized. Maybe they shouldn't teach if they have bad tempers and are going to be impatient. Players like that may not be the greatest teachers but they could still instruct.

Even the more experienced untrained teachers did not seem to possess a great deal of general pedagogical knowledge.

When asked what volleyball teachers needed to know beyond performance knowledge Celia responded:

They need more technical knowledge of the sport. In the last twenty years there have been so many new advancements and rules. That's something you have to keep up with. If not, I don't think you can be all that effective a teacher.

A further indication of the differences between the two groups of teachers in educational knowledge was illustrated in their differing responses when presented with the hypothetical situation of teaching a physical activity with which they were not familiar. Untrained teachers struggled with the idea. Some came to the conclusion that absent substantial and prolonged engagement with the sport, they would not even attempt to teach it. The following comment by Mary typified this point of view:

I really don't think I could teach something, like soccer, that I hadn't done very much myself. I wouldn't feel like I was being effective because I know that someone who has been a soccer player could teach students more. I wouldn't feel comfortable.

Other untrained teachers reluctantly admitted that they might be able to teach an introductory level class in a sport they hadn't played.

On the other hand, trained physical education teachers were quite comfortable with the idea of teaching a sport activity with which they were not thoroughly familiar. They cited various examples of having taught new subjects and several expressed confidence that their generic teaching skills would compensate for any lack of in-depth knowledge about the subject. Dan said:

Gymnastics is a good example. I can't do it to save my life, but I could teach it well. I've taught it and it went really well. From rings to balance beam. I took a skills class and learned how to teach it. You have to break things down to the basics, which I think I learned to do from teaching other things.

The difference between trained and untrained teachers in the area of general pedagogical knowledge raises several

interesting issues. First, the absence of comments made by untrained teachers about general teaching practices stood in stark contrast to the relatively high awareness levels of such practices on the part of trained physical education teachers. This is consistent with the earlier finding that trained teachers elaborated more extensively on general teaching practices when they watched a videotaped lesson. It would be apparent that failure to comment on general aspects of teaching goes beyond lack of familiarity with the formal language of education. Untrained teachers did not substitute common language terminology in attempts to identify salient elements of the instructional process. There was no evidence that they noticed important events for which they lacked a conceptual language. The preponderance of evidence is that they did not notice what they could not name.

Additionally, because responses to probes for general pedagogical knowledge were similar on the part of novice and experienced untrained teachers, acquiring such knowledge does not appear to be solely a function of teaching experience. It would appear that development of this knowledge is, at the very least, strongly influenced by experiences gained through formal teacher preparation. Untrained teachers may well possess some teaching skills associated with general teaching principles, but development of such skills would likely be the result of a trial-and-error approach. Acquiring such skills would depend solely on the intuitive senses of

the untrained teacher rather than by reflective self-analysis based on knowledge of effective educational practices.

Pedagogical Content Knowledge

Shulman defines this category of knowledge as "that special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of understanding" (1987, p.8). Of particular interest to the analysis of results in this study, Shulman goes on to classify pedagogical content knowledge as a category that "distinguishes the understanding of the content specialist from that of the pedagogue" (1987, p.8). In relation to physical education, the following aspects of teaching have been identified as indicators of pedagogical content knowledge: knowledge of proper technique, common performance errors, correction procedures, developmental levels of learners, and appropriate representations of the content.

It already has been shown that the content knowledge among the trained physical education teachers tended to include less detailed awareness of volleyball and more consciousness of generalizable principles associated with a variety of sports. It also has been indicated that the untrained physical education teachers appeared to lack an understanding of general pedagogical practices associated with effective teaching. While it thus might be easy to say that both groups of teachers lacked fundamental knowledge

essential to the development of pedagogical content knowledge, the argument is not that simple. How much content knowledge, for instance, is required to be able to create appropriate learning activities? Does this vary according to the level of the learner? Can a teacher possess sufficient pedagogical content knowledge to effectively teach beginners, but not more skilled students?

While the responses of the teachers in this study can not conclusively answer these questions, certain working patterns did emerge. An instructor's special understanding of the subject for teaching appears to be heavily influenced by teaching experience and to a lesser extent by formal training. Thus, among the eight participants in this study a discernible hierarchy existed. The four teachers with the most teaching experience - two each from the trained and untrained groups - displayed the greatest awareness and deepest understanding of teaching principles associated with pedagogical content knowledge. They were followed by the two trained novices, who displayed lesser degrees of awareness, and finally by the two untrained novices who could neither identify nor discuss, in great depth, areas of teaching that went beyond volleyball skill technique.

Among the experienced teachers, all four discussed proper technique, common performance errors, and correction procedures. Celia mentioned the first two of these:

It's good to learn the overhand motion of volleyball serve early on because it keeps a person from starting to develop bad habits like pushing out from the shoulder.

Bob stressed a teaching procedure that emphasizes correcting one thing at a time:

When you explain things to a student, you have to be able to break things down into individual components. With the volleyball serve, it's important to get the toss down and then move on to other things. Explanations to students should be simple and clear so they can understand it better.

Experienced teachers also were more aware of developmental levels and learner differences. Vic talked about the importance of the first of these:

You have to adapt what you're trying to teach to the different audiences that you are dealing with. I've taught beginners on the one hand and I've worked with adult members of a team on the other hand. A P.E. class is more relaxed than a team situation, and you have to present the material differently.

Kim developed this point:

It's important to have an understanding of the people you're working with so that you can teach to the level that they are at. You can come in to a class and have your full expectations of what you're going to teach that lesson, but if the kids aren't ready for it you have to adapt your knowledge of the material to where the kids are.

Later, Kim talked about learner differences:

With kids being the way they are, no matter what age, some people will learn from a verbal explanation while others have to see a picture.

In the area of appropriate representations of the material, untrained experienced teachers, with great frequency, discussed specific volleyball practice activities, while their trained counterparts talked more generally about the need to break a skill down through a progression of activities. In both cases, however, experienced teachers emphasized the importance of activities that matched the

level of the learner and promoted a positive atmosphere for learning. All four teachers said that they would play games in their classes, but would modify the games to work on a certain skill. Celia gave an example:

I like to split up the class so we have about twenty minutes of drills and the rest of the time playing. When I have them play I like to emphasize the skill we had gone over. If it was setting I might have everybody set the ball during the game.

Other experienced teachers suggested creating "game-like" activities that were challenging and fun for the students, yet continued to develop a particular skill. Examples with the serve included aiming at areas and targets and keeping track of accuracy.

In sum, experienced teachers tended to be acutely aware of the relationship between content and learners. It is understanding this relationship that may well be the essence of teaching knowledge. Vic most lucidly formulated this understanding:

There are many natural athlete types who are unable to communicate. When you're dealing with a kid who's just asked a question, you've got to be able to put an answer in terms that the kid understands. Many athletes are so natural that they've never analyzed what they do. They can learn it clearly, and they may be very articulate people, but they don't understand why other people struggle with it.

This view that the most skilled performers, by the very nature of their skill, may not make the best teachers is also postulated by Berliner (1988) who cites numerous examples from sport, dance, and music illustrating the fact that many who have been the most successful "teachers"

in those fields were themselves often far from distinguished performers.

Among trained novice teachers there was a degree of awareness of those components that constitute pedagogical content knowledge, but little integration of them in the manner that distinguished the more experienced teachers. They could clearly discuss educationally sound principles such as awareness of developmental levels and learner needs, and they appeared to have the same degree of content knowledge as their more experienced trained counterparts. What they lacked was the experience, over a period of time, of applying their abstract general knowledge to the practical task of teaching a specific sport skill. They were not, for example, as aware of common performance errors made in the volleyball serve or of appropriate correction procedures.

Neither teacher in the untrained novice group displayed the least awareness or understanding of those factors related to pedagogical content knowledge. These teachers perhaps best represent what Shulman calls "content specialists" as distinguished from the other participants in this study who could be considered Shulman's "pedagogues" (1987). Unlike the other teachers in this study, the two untrained novice teachers had neither the benefit of formal training nor extensive experience upon which to draw knowledge about teaching. What they did possess was a degree of performance knowledge developed from competitive playing experience. This, and their experience as students,

represented their only sources of knowledge for teaching. In this respect their profiles were similar to those novice teachers in Lortie's study (1975) who formed perceptions about teaching from their "apprenticeship of observation."

Like Lortie's participants, the untrained novice teachers in this study had a distinctly one-sided student perspective about teaching. They viewed the teaching and learning process as a simple one that relegated the teacher's role to "organizer of games". John put the matter in so many words:

I think the whole purpose of a gym class is to play games. I can teach a volleyball class till I'm blue in the face, and it still won't be as good as playing. All the students would be saying "when can we start playing."

Both teachers placed a high value on playing regulation games apparently unaware of alternative modified games that would satisfy the goals of skill development and the student desire to play.

In a further manifestation of the student perspective shared by both untrained novice teachers, it is revealing that during the viewing of the lesson and subsequent interviews these teachers would sometimes react as if they were actually students in the class. In one instance, the teacher on the videotape asked her class a question about the floater serve. Both John and Mary, responding as if they were students, answered the question. The six other participants all maintained the role of a teacher in viewing and talking about the lesson.

To summarize, the range of comments made by both trained and untrained experienced teachers indicated that they had the greatest awareness of those aspects of teaching associated with pedagogical content knowledge. Fewer comments were made, and less depth demonstrated, by trained novices whose level of understanding seemed restricted by their relative lack of experience. Finally, the untrained novices displayed virtually no awareness or understanding of those educational components linked to pedagogical content knowledge.

Influences on Teacher Development

The process by which teachers acquire the various forms of knowledge discussed above is often subtle and occurs as a result of development. As Clark (1985) discovered it is virtually impossible to isolate any single experience and link it to a specific teaching act. Clark found that teachers were more likely to attribute many of their teaching behaviors to their own inventive capabilities than to any external source. While probably taking it for granted that more complex factors were involved, Clark so designed his research as to elicit from teachers their explicit sense of a relationship between a teaching act and its source.

In this study, the eight teachers discussed in general terms the sources for their knowledge about teaching. They were asked to look back on their lives and talk about major influences on them as teachers and then to elaborate on the development of their present repertoire of teaching skills.

Three major sources of influence on teacher development emerged. They were role models, training, and experience. The latter source included experience as a student, teacher, and player.

Role Models

All eight participants recalled individuals who had made an impact on them as teachers. They ranged from instructors and coaches to parents and colleagues. One distinguishing feature in the discussion of role models was that the six teachers with either formal training or experience were able to analyze in very specific terms what there was about a role model that had influenced them as teachers. Tammy discussed her parents' influence:

My parents always treated me like I could do anything. They never told me that there were things girls couldn't do. They always instilled in me that practice makes perfect. And that was something that wasn't just talked about but modeled too. I had to write English papers in the summer because my parents thought we weren't getting enough in school. They built me up, they didn't push me down and make me feel bad. They gave me a lot of positive, specific feedback and they always found what I was doing good and they would encourage me in the places that needed work. I model that as a teacher from my parents.

Celia talked about how she applied what a former coach did and did not do to her own teaching:

My high school volleyball coach gave everybody individual attention. She had great coaching skills too. She was always a very upbeat person. She communicated things effectively, yet there were a couple of times that I noticed she would tend to favor people who were better skilled at the expense of people who were not as good. It's those people who are less skilled that could use

the extra attention. So that's one of the things that I also learned by seeing her not do it that way.

The two untrained novice teachers were far less detailed when recollecting the influence of role models. While they did acknowledge people from whom they learned, when probed, they did not discuss particular relationships between what these people did and their own teaching practice. John gave credit to his father who was a coach:

I picked a lot up from my dad. He definitely showed me a lot. Everything from drills to tactics and techniques.

In addition, these two teachers seemed unable to distinguish with any great clarity the influence of role models on their own personal skill development as volleyball players from the impact on them as teachers. In one instance Mary broached the subject of learning to teach but lapsed into commenting on learning volleyball skills:

My high school instructor's way of teaching was the first way I learned how to teach. It was the first time I learned how to do a skill. After that I had lots of coaches and I just made my own modifications, my own way of learning volleyball.

In brief, the six teachers who were either formally trained or had had substantial teaching experience displayed, to some extent, the analytical ability to identify the relationship between their development as teachers and the actions of role models. Although the sources that contribute to it may involve an intermingling of many influences, the capability to process precisely what a role

model did and to apply that information to teaching practice would appear to be heavily influenced by both training and experience.

Training

The influence of a formal teacher education program was discussed, to varying extents, by all four trained teachers. Not surprisingly, the two novice teachers talked more extensively about specific events in their undergraduate programs that directly influenced their teaching. Dan touched upon some things he learned as a physical education major:

A lot of the teaching skills I have now, I picked up in my physical education program. I didn't know how to teach until I entered the program, and they showed me different ways to teach - the styles, methods of control, discipline, feedback, and all that. And then, we got to apply that stuff during elementary and secondary pre-practicum.

Later Dan discussed skills classes he had taken:

They were very helpful. I kept the notebooks from all those classes, and I use them when I teach. I taught tennis for the first time on my own this past fall, and I used the same progressions and rules from the class I had taken. I did the same thing with soccer.

Tammy, another novice teacher also ascribed some of her teaching skills to her undergraduate program:

The main thing being a physical education major did for me was logistical, figuring out that equipment needed to be spread out and set up so that people are encouraged to have more activity time.

Later Tammy continued:

Another thing the [physical education] program did for me was make me more aware of the kinds

of impact feedback has, so that I could really be specific and intentional about my feedback.

More experienced trained teachers also talked about formal training, but were more inclined to discuss the more recent experiences associated with inservice or masters degree programs. Bob talked about the influence of a graduate program in which he was enrolled:

Having supervising teachers from the university come in and work with me and taking courses at the university was a key factor in motivating me to find different ways to self-evaluate and make changes. The first course that I took had a real major influence on the different things that I can do to observe and evaluate myself.

While the four trained teachers in this study had all undergone some form of formal training, the four untrained teachers had no such common reference point from which to judge their development as teachers. The two experienced untrained teachers had been exposed to subject-specific training in the form of short term volleyball coaching clinics, and both referred to these experiences as a vital source of information regarding new learning activities and skill techniques. At the same time, both teachers acknowledged that these clinics were only marginally relevant to the skills needed to teach a beginning volleyball class. While the degree of impact training has on teacher development remains unclear, there is no doubt that untrained teachers have fewer resources from which to acquire teaching skills. When learning how to teach they must rely, almost exclusively, on their experiences as athletes, students, and teachers.

Experience

Three types of experience were identified by all eight teachers in this study. They were teaching experience, student experience, and athletic experience. As virtually their sole source of teaching information, untrained teachers frequently referred to all three forms of experience as primary sources of information and knowledge about teaching. Novice teachers talked more about their roles as students and players.

John remembered one class and how it influenced his confidence as a teacher:

In high school I took this project adventure course, and we had to do some pretty amazing things. I learned about teamwork, coordination, and trust. I learned how to conquer my fears. Now I'm not afraid to walk into a class as a teacher hoping there's nobody better than me. I walk into a class confident, saying, "Hey if there's someone better than me I'll learn from him."

Later John discussed being a volleyball student and how that had had a direct impact on him as a volleyball teacher:

During my freshman year in college, I took a volleyball course from Cathy. Sometimes she would have me demonstrate while she actually taught. Later on Cathy and I would teach together. While I was teaching with Cathy, she would lay down the basis of what we were going to do on any given day. She would teach, and I sat back and listened. I didn't open my mouth, just sat back and listened and did what she told me. Now I can turn around and do the same thing with a new instructor.

John's account of his development as a volleyball teacher sounds reminiscent of the apprenticeship process one associates with medieval craftsmen. Absent from the mentoring relationship with Cathy is any recognition that learning to teach is an ongoing reflective process that

involves critical thinking and evaluative skills. John's conception of learning to teach appears to be the unquestioning repetition of teaching practices exhibited by a more experienced teacher. While sitting and watching an experienced, and presumably skilled, practitioner may well have some educational value, the assumption that this experience alone is sufficient for teacher preparation is roughly equivalent to the claim that there is a strong connection between watching a skilled athlete and becoming one.

Mary, another novice teacher, talked about experiences as a volleyball player and how they affected her thinking as a volleyball teacher:

If my coach told me to use a certain method or a certain skill during a match and it didn't seem to work for me, as a teacher I wouldn't recommend it to my students.

Later, Mary pointed out how her experience as a high school volleyball player influenced her attentiveness to her own students:

As a learner, when I was in high school there were moments when my coach would come up to me as an individual and explain that I wasn't doing something right or I was doing something well. This indicated to me that the coach was paying attention to me. I try to make sure that I give that kind of attention to my students.

Mary's comments seem to reflect a strong relationship between positive and negative personal learning experiences

and teaching practice. This relationship is also referred to by Vic, a more experienced untrained teacher:

As a student if something was obscure to me or ridiculously simple I reacted to that. So some of my teaching is a question of reactionary behavior. I saw things that I either liked or didn't like, and I incorporated some of them into my classroom. I guess this happened through osmosis.

While it is not surprising that both Mary and Vic relied on on their own learning experiences as guides for teaching behaviors, this inclination does suggest a rather narrow understanding of learning differences among students. Once again, there is undoubtedly some educational value in drawing from personal student experience, but as a primary, or exclusive source for teaching information it runs the risk of being dysfunctional. If one accepts the premise that a teacher's behaviors should mirror teaching acts derived from successful learning on the part of the teacher, then one assumes that all student learning patterns are similar to that of the teacher. This is at best a dubious assumption.

Experienced untrained teachers attributed some of their teaching knowledge to their experience as teachers. Celia talks about how teaching influenced her views about positive reinforcement:

From my experience as a teacher, I've seen that positive encouragement helps make students more receptive to learning skills than criticism does.

Vic also talked about the influence teaching had on his development of disciplinary skills:

I used to have more collisions with students over behavior things. I did a bunch of things wrong, but I learned how to control things eventually. I never

really analyzed it. I just sort of picked up ideas one by one and realized my classes began to function more smoothly.

While it is clear that since teacher development does occur through teaching experience alone, Vic accurately points out its major drawback when he describes this "trial-and-error" approach over many years as a "very inefficient progression."

In examining the perceived influence of experience among trained teachers, they too indicated that teaching played a major role in their development. In contrast to the untrained teachers, however, they almost exclusively located such teaching in the context of some kind of formal training. The two novice teachers commented extensively on their student teaching experience as a major influence on their behavior as teachers. Dan reported:

As a student teacher, I actually got to put to use what I had learned in classes. The cooperating teachers I had really helped sharpen my teaching skills. One of them would give lots of specific feedback and helped me improve my skills.

Tammy also singled out her student teaching:

The thing that had the most impact on me as a physical education teacher was when I did my student teaching. The cooperating teacher was such a strong educator. We got along great, and I really liked what she was doing with the students. So I worked my tail off to be able to emulate that.

The two experienced teachers saw the influence of teaching in more developmental terms. They considered their teaching skills to have evolved as a result of cumulative teaching and post-graduate experiences. Kim pointed to

teaching among colleagues with diverse areas of knowledge as a strong influence on her:

We have five people in our department, and everybody comes in with their special expertise. Many times we have to teach something we're not familiar with, and the other teachers are really good at sharing what they do best with us so that we can then become better than adequate at teaching something that may be totally foreign to us.

A major distinction concerning the influence of teaching experience on the untrained teachers is that their teaching occurred in isolation and under conditions in which no assistance was available to help them learn from the experience. For them, teacher development occurs in rather haphazard fashion and at a relatively slow rate. Vic recognized the attendant dilemma:

Learning to teach successfully was just a bloody trial and error situation. I mean I had kids who were doing fist fights in the early years because I just did not understand what their motivations were. You have to know what questions will lead to the right kind of responses. I'm still new at that, and I've taught for eleven years.

By contrast, the guidance which trained teachers received in conjunction with teaching allowed them to develop teaching skills they may never have fully acquired on their own. Dan acknowledged this:

Before I came to college I coached different sports, and I can see now how I would have done things differently because of my learning to teach. I say to myself, "Wow", if I had known five years ago what I know now I would have been a much better baseball coach. I used to just hit grounders to the kids, and if they missed it, they missed it and if they got it, they got it. But I never gave them any helpful feedback. I was very very weak with that before I came through the P.E. program and actually learned how to do it.

Dan's comments clearly illustrate the impact of training on the substance and rate of his teaching development. It is revealing that at the end of his second interview session, Vic, a veteran teacher in a private school who possessed a Masters degree, inquired about enrollment in a graduate education certification program with the goal of learning more about teaching.

Chapter Summary

This chapter examined the development of knowledge among eight physical education teachers. Four of them were certified secondary physical education teachers and four were untrained specialists in the area of volleyball, who taught in either a college activity program or a private school. Two teachers from each group were experienced and two were novices.

In the first phase, data drawn from the responses of participants to the task of thinking aloud while watching a videotaped volleyball lesson were categorized and subject to analysis. There were differences and similarities in what was attended to in the following areas: the lecture, use of time, teacher monitoring, teacher feedback, learners, subject matter, representation of the subject matter, and class management. The pattern that emerged indicated that among these participants trained teachers attended, with greater frequency and elaboration, to those topics generally related to formal models of effective teaching. These included teacher monitoring, teacher feedback, and

class management behaviors. The untrained content specialists were more inclined to notice those aspects of the lesson associated with the sport of volleyball such as the subject matter - the floater serve - and the lecture.

Members from both the trained and untrained groups talked about how the subject matter was presented, the learners, use of time, and class management. Within these areas trained teachers tended to be more concerned about generally applicable teaching practice, while the untrained subject specialists limited their remarks to comments on specific events in the videotaped class.

Experienced teachers from both groups talked in more detail, and offered more explanations for events, than their novice counterparts. This supports similar findings by Berliner (1988) in a study of experts and novices from a variety of professions.

The second phase of the data analysis involved examining knowledge differences among the eight teachers in relation to training and experience. The three areas of knowledge discussed were content knowledge, general pedagogical knowledge, and pedagogical content knowledge.

Teachers from the untrained group manifested a greater depth of knowledge about the content of volleyball. Trained teachers displayed a greater understanding of those general teaching practices, such as teacher feedback and organizational skills, which transcend the content of what is being taught. Experienced teachers from both groups

displayed an awareness of the relationship between content and the learning levels of students which is critical to the development of pedagogical content knowledge. Trained novices were less aware of this relationship, and untrained novices totally lacked it.

Finally, this chapter examined the sources that influenced the growth of teaching knowledge among the eight teachers in this study. They included role models, training and experience.

All the participants cited individuals as having had an impact on their lives as teachers. They ranged from former instructors, to parents, siblings and colleagues. Trained teachers were better able to talk explicitly about the actions of role models and their own teaching behaviors, while untrained teachers were less specific in their reflections. Trained teachers talked extensively about the influence of formal teacher education. Each one cited numerous examples of teaching behaviors that they linked directly to their formal training.

All eight teachers pointed to some form of experience as having influenced their development as teachers. Among trained teachers, novices commented extensively on their student teaching roles while the more experienced talked about working with colleagues and student teachers. The untrained teachers saw a strong relationship between

their experiences as athletes and students and their growth as teachers, with the two veterans also crediting teaching experience as a way of learning through trial and error.

CHAPTER VI

DISCUSSION

Summary of Findings

The purpose of this study was to investigate how people learn to teach by examining the development of teaching knowledge among eight physical education teachers. The investigation focused on three primary areas: topics attended to when watching a volleyball lesson, knowledge differences associated with training and experience, and sources of influence on the development of teaching knowledge.

Topics Attended To When Watching a Volleyball Lesson

When the teachers in this study watched a twenty-two minute volleyball lesson, their comments fell into three broad categories: teacher behaviors, student actions, and the subject matter. While the frequency and nature of the individual comments varied among participants, discernible patterns did emerge. Untrained teachers focused more and in greater detail on the subject matter of volleyball, while trained teachers tended to direct their attention more toward teaching behaviors such as monitoring and feedback. A similar distinction existed when the participants discussed student actions. Untrained teachers attended primarily to performance skills related to the subject matter of the lesson, while trained teachers were more likely to comment on such general student actions as on-task and off-task behavior.

While these findings are perhaps predictable, they do draw attention to the fact that people tend to talk first about what they know, which is to say things about which they are most familiar. The untrained teachers in this study had extensive exposure to the sport of volleyball and thus were more comfortable in talking about that subject than about problems of instruction. In contrast, the trained teachers had been exposed to principles and practices of education through a teacher education program. Their technical vocabulary included both the conventional language and specific pedagogical concepts introduced through formal training.

Presented with the same lesson, trained and untrained teachers both attended to different elements in the display, and talked differently about the elements they choose to comment upon. How important are those differences and what do they imply? Do different priorities in observation and the use of different vocabularies reflect genuine and substantial differences in knowledge? The assumptions which guided this study hold that the participants' comments did reveal substantial differences in knowledge, differences which inevitably would be critical in determining their behavior as teachers.

It is reasonable to assume that what teachers choose to talk about when commenting on a lesson does reflect what they deem to be important. What they notice is a reflection of what they value. It follows then that these values will be

given primacy, for example, when planning a lesson. In addition, the repertoire of technical constructs teachers possess represents the limits for what can be reflected about during the self-evaluation phase of the teaching process. In other words, if the concept of feedback is not available in a teacher's cognitive repertoire, then it will neither be attended to when watching a lesson taught by another teacher, nor be incorporated into how the teacher thinks about his or her own lessons.

It may well be that at the level of common-sense generalization, untrained teachers (particularly experienced ones) are aware of some general principles of instruction. The relevance of such tacit awareness is negligible, however, if understanding is not sufficiently developed to recognize instances as they occur in the context of daily work. The debate about the importance of training, then, should not center simply on whether or not a unique knowledge base is imparted to prospective teachers. It also should include recognition of the necessity for creating both a value structure and a depth of understanding that are required if teachers are to recognize situations which call for the implementation of professional knowledge.

Knowledge Differences Associated with Training and Experience

The nature of the data and procedures for analysis require several caveats which the reader should bear in mind.

The first of these is related to the process of categorizing data.

The three areas of knowledge addressed in this study were drawn from Shulman's (1987) model and include content knowledge, general pedagogical knowledge, and pedagogical content knowledge. Inherent in the nomenclature for these categories is the recognition that a certain degree of overlapping exists. For example, in discussing the differences in knowledge among eight teachers, Marks (1990) noted that while Shulman's model offered a useful way to examine the different knowledge structures associated with their teaching, organizing the teachers' words to fit those categories was seldom a simple and precise process. There were frequent instances of multiple membership and untidy leftovers. Likewise, in the case of the present study, comments made by the participants often could be represented by more than one category. When a teacher talked about the content, for example, he or she often would do so in terms of how best to teach it. In such cases, it was inevitable that a combination of subjective judgement and arbitrary decision rules had to be used to determine the most appropriate categorization.

A second caveat involves the fact that no attempt was made to establish the objective correctness of the participants' remarks. In some cases comments clearly reflect a misconception about the lesson or involve a factual error concerning the subject matter, but these were

categorized and reported without comment. The patterns that emerged, then, are accurate representations of what participants elected to talk about, but imply no confirmation that what they said was true. Consequently, if a teacher talked at length about a rule in the sport of volleyball, this would constitute a display of content knowledge, even if his or her understanding of the rule was imperfect.

Content Knowledge

In the subject area of volleyball, untrained teachers not only exhibited a deeper technical knowledge, but also a more analytical perspective on the sport than did the trained teachers. This undoubtedly was due to the fact that all the untrained teachers were competitive volleyball players who had been exposed to extensive coaching. Only one of the trained teachers had played competitive volleyball, and in that case not extensively. This simple observation raises the issue of the importance of content knowledge to teaching. Siedentop (1989), for example, has expressed dismay that physical education teachers lack a solid grounding in the content of what they are teaching. He points out that "lay persons" such as the untrained teachers used in this study often know more about the subject matter of particular sports than do many physical education teachers formally entrusted to teach that content in public schools.

Debates about the relationship of content knowledge to teaching deal less with the question of importance and more with the matter of degree. Most people would agree that some

basic level of content knowledge mastery is indispensable to effective teaching. The decisive question remains: how much of this knowledge is enough? One also must determine the degree to which performance skill, taken alone, may be used as a valid indicator of this knowledge. Finally, and most practically for curriculum design in teacher education, is one undergraduate course sufficient to develop the content knowledge required to teach an introductory sport skill class?

While these questions were not answered by the present study, the participants themselves held surprisingly uniform views about at least one closely related matter. Teachers from both the untrained and trained groups admitted that they felt more comfortable teaching sports in which they had actively participated. This was particularly true of novices who believed that credibility and confidence were enhanced by being in possession of strong volleyball skills. Almost all the teachers believed that before they taught a physical skill they would first like to have had it taught to them. Trained teachers pointed to this experience not only as a means for personal skill development, but also as a significant source of teaching strategies.

General Pedagogical Knowledge

In regard to awareness and understanding of general principles of education, such as the use of feedback and strategies for efficient class management, the trained teachers were demonstrably in possession of more formal

knowledge than their untrained counterparts. This is not surprising given the probable nature of their undergraduate training which would have stressed many of these concepts.

The value of knowing educationally sound practices is beyond question. Knowing how to control and manage a physical education class so that there is sufficient structured activity to promote both skill acquisition and a positive learning environment is central to being an effective teacher. The only question is how best to develop this knowledge. While untrained experienced teachers may gain some insight into teaching practice through the trial-and-error process of doing it, this method of learning is inefficient at best and unreliable at worst, depending as it does on the caprice of opportunity and the variable powers of individual analytic skills. Untrained teachers, both experienced and less experienced, showed little evidence of possessing even a rudimentary understanding of the various educational functions of such basic principles as teacher feedback and student activity time.

Pedagogical Content Knowledge

While scarcely a new concept, the idea of understanding a subject matter in terms of how best to teach it, as distinguished from understanding it in purely personal terms, remains a difficult form of knowledge to define. This study attempted to identify several key aspects of teaching related to pedagogical content knowledge for the subject area of physical education. While such knowledge constitutes an

amalgam of the two categories discussed above, its essence lies in integrating information about learners and content so that ultimately its user can create representations of the subject matter in the form of appropriate learning activities.

The probes for pedagogical content knowledge did yield several consistent patterns. Experienced teachers were more aware than relatively inexperienced teachers of the relationship between the content and the developmental level of learners. They discussed the importance of presenting material that students could understand. They suggested a flexibility in teaching that would allow for varied teacher actions. Novices, on the other hand, were more attached to established routines and appeared less inclined to modify how they taught in relation to the skill achievement level of the learner.

There still is much need for further investigation of pedagogical content knowledge in physical education and how it is assimilated and learned by teachers. Nevertheless, it is clear that teaching experience plays a critical role in its development. This finding lends support to the notion that preservice programs should maximize the opportunities for prospective teachers to acquire pedagogical content knowledge through early, supervised teaching experiences. A key component in such clinical experiences would be the development, supervision, and practice of learning activities that are linked closely to the content being taught.

Sources of Influence

All eight teachers in this study were probed for factors that influenced their development as teachers. Their responses may be broadly classified as those of role models, training, and experience.

Role Models

All the participants alluded to the influence of specific individuals on their acquisition of knowledge about teaching. Trained teachers often credited former teachers as having had an impact on their values and beliefs about teaching. In contrast, untrained teachers more typically emphasized the formative role of coaches.

Trained teachers talked more extensively about particular influences which role models had on their teaching. They referred to management strategies, use of feedback, and learning activities. They also viewed some teachers as "inspirational" and pointed to them as caring motivators worthy of emulation. Untrained teachers were much narrower in their perceptions of role models such as former coaches and the influence they exerted. They saw these models primarily as sources of knowledge about specific drills and activities relating to volleyball.

The difference between trained and untrained teachers with regard to the perceived influence of role models sheds some light on how members of these two groups viewed teaching as a profession. Implicit in the remarks of trained teachers was a recognition that teaching involved the implementation

of established principles of education and that the role of a teacher went beyond promoting skill acquisition. They saw their role as one that contributed to the learner's overall growth. The perception of teaching held by untrained teachers focused primarily on volleyball skill development. To them, there was no other significant agenda.

Training

The impact of formal teacher education was discussed extensively by the four trained teachers. Although the relationship between formal training and effective teaching was not directly covered in this study, it is worth noting that all the trained teachers believed their formal training had made them better teachers. They saw themselves as individuals with unique skills and knowledge, and expressed confidence in their ability to teach subjects with which they were comparatively unfamiliar. Some indicated specifically that they had been less effective as teachers prior to entering an undergraduate physical education program.

Formal teacher education contributed to a sense of professionalism on the part of trained teachers. By the same token, untrained novices struggled with the perception of themselves as teachers. Although they taught a university level physical education class, the two untrained novice teachers did not perceive themselves to be teachers per se. The classification of "teacher" was imposed by the researcher. They generally referred to themselves and their untrained colleagues as volleyball "instructors" or

"coaches". This distinction reflects a self-perception that no doubt influences how they go about the task of teaching.

To participants without formal training, teaching was not a career choice. It was more like an enjoyable hobby that afforded them the opportunity to maintain contact with a sport they loved. This is directly reflected in the fact that they themselves devoted a significant amount of time to playing volleyball in their classes.

One of the two experienced, untrained participants, Vic, a career private school teacher, acknowledged that lack of formal training had hindered his development as a teacher. He perceived himself as an outsider to the profession of education. He made self-deprecating remarks about his knowledge of teaching and often contrasted himself to "trained educators".

There appears, then, to be a relationship between training and the self-perception of teachers in this study. Trained participants viewed themselves as professional educators while the untrained participants saw themselves as something other than full-fledged teachers - with full responsibility for a teacher's educational agenda. This finding may have an important bearing on the basic debate about the value of formal teacher education. Very possibly, more attention should be paid to the relative value of formal programs in socializing recruits into a sense of membership in the profession of education. Can content specialists who do not view themselves as teachers develop into effective

practitioners? The results of this study indicate that content knowledge alone does not suffice in helping individuals think of themselves as teachers.

Experience

While all eight teachers in this study indicated that some form of teaching experience had an impact on the way they taught, the nature of that experience varied greatly from one to the next. Untrained teachers alluded to aspects of teaching about which they learned while being students or members of athletic teams. More experienced untrained teachers also discussed learning by trial-and-error through repeated teaching experience.

Trained teachers, on the other hand, talked extensively about the teaching experience they had received in conjunction with formal training. Trained novices credited much of their development as teachers to the lessons learned during supervised student teaching, while more experienced trained teachers cited their clinical experiences in graduate programs and their supervising work with student teachers as sources for ideas about teaching.

In contrasting the experiences of trained and untrained teachers, it is revealing that untrained novices had no clinical experiences prior to actually teaching classes. Trained novices, on the other hand, had a series of clinical experiences that included a semester of student teaching prior to assuming sole responsibility for a class. More experienced teachers from both the untrained and trained

groups had taught extensively, but the teaching experience cited by the trained teachers as the most beneficial had generally been supervised by a teacher educator.

It is safe to assume that most people will learn at least something about teaching through unguided practice over extended periods of time. Two issues that arise, however, relate to the quality of that learning and the rate of its development. While this study was not designed directly to address these issues, it did shed some valuable light on both. In examining the pedagogical knowledge differences among these participants, it was clear that a qualitative hierarchy could be detected in their comments. The most experienced teachers from both groups were the most aware of elements which constitute this unique form of "teachers'" knowledge. They were followed by trained novices who had an obviously less integrated understanding of various aspects of teaching; and they were followed by untrained novices who showed little awareness or understanding of this type of knowledge.

In examining this pattern further, there appears to be a relationship between the differential acquisition of pedagogical content knowledge and the nature of accumulated teaching experience. Among the experienced teachers, those who were untrained regarded their development as haphazard. While not denying that they had acquired teaching skills, the untrained teachers claimed that they had learned from

frequent mistakes. As Vic pointed out, this "trial and error" approach was at best "inefficient".

When contrasting novices from both the trained and untrained groups, it is evident that those who were trained had a head start in their acquisition of pedagogical content knowledge. The guided teaching experience they had received through their teacher education programs contributed to a foundation of knowledge, although not yet fully developed, that their untrained peers lacked. Further, the supervised teaching experiences of the trained teachers in this study appear to have contributed to both a quicker and a more systematic development of teaching knowledge than the unguided experiences of the untrained participants.

Reasons For Differences Among Participants

The two major areas of contrast in this study related to training and experience. In examining trained and untrained teachers, with varying degrees of experience, three salient factors seemed to account for differences in teacher growth. They were teaching context, varying perspectives, and expert/novice knowledge. The precise etiology of differences is seldom (or never) simple and distinct. Nevertheless, the following discussion does identify aspects of the three factors which appears to play an important role.

Context

Often understated when describing the evolution of teaching knowledge, the influence of particular settings or work sites was pronounced. The teaching experience of the

the four trained participants was limited to physical education classes (including volleyball) in public secondary schools. Among the four untrained participants, three taught volleyball classes in a university GPE program, and one taught and coached volleyball in a private residential high school. These contextual differences in work history produced perspectives which sometimes were similar, but more often sharply distinct.

At various points while viewing the videotaped lesson of a college volleyball class for physical education majors, all of the participants noted differences between that class and the classes they taught. Prominent among those differences were the relatively low number of students, their high maturity level, and ample equipment. Respondents in both the trained and untrained groups said that because of institutional constraints they could not conduct classes like the one they viewed. Public school teachers, for example, noted that they would have to deal with more disciplinary issues and could not interact as "sociably" as the college instructor in the videotape. They indicated that the larger numbers, younger students, and limited equipment and facilities that typified their teaching context necessitated a more structured environment and more formal student/teacher interaction.

Untrained teachers of the university GPE classes also believed their sections were qualitatively different from the one they had just viewed. These teachers likewise

underscored "less equipment" and "greater numbers", but they added something else, namely, that it was impossible to stress instruction to the extent illustrated in the taped lesson because of the recreational attitude held by their students. They pointed to the elective nature of the courses, a common grading policy weighted heavily for attendance, and expectations on the part of both students and administrators that de-emphasized skill acquisition and focused on recreation and participation.

Given these vastly different contexts and the disparate teaching goals within them, it is not surprising to learn that members of the trained and untrained groups chose to talk about aspects of the lesson they viewed as relevant to their own teaching. Neither is it difficult to imagine that what these individuals absorbed about teaching was largely formed and shaped by needs or concerns inherent in their particular situation. The GPE instructors, who appeared to have acquired almost no general pedagogical knowledge, had little actual need for strategies relating to class control, discipline, or management. In contrast, such knowledge was crucial in the workplace of public schools, and trained teachers accordingly, gave it priority in their observations. Because of the diverse and introductory nature of the activities they taught, the participating public school teachers did not need sophisticated content knowledge and thus had little to say about in their comments.

Perspectives

Another important element in differential teaching knowledge among the participants was the view each held on the essential nature of teaching. Three distinct perspectives emerged from the data: those characteristics of the coach, the teacher, and the student.

Coaching Perspective. All four of the untrained teachers had been or were active competitive athletes in the sport of volleyball. In addition, at the time of the study, two of them were active volleyball coaches. Their primary source of information about teaching volleyball came from competitive athletic environments. When talking about class situations, they often referred to game playing as "scrimmaging" and learning activities as "drills". To them, there was not a clear distinction between what happened in a class and what might happen in a team practice session. Vic, the most experienced untrained teacher, said he used the identical drills in both situations, the only difference being his lower expectations for the less skilled class members.

The heavy influence of coaching and playing on these teachers' conception of teaching carries with it some interesting implications. While not an altogether negative source of information, the coaching model of instruction does have the potential to create a counterproductive learning environment when transposed into a class setting. While teaching and coaching goals may share some common

ground, such as skill development, they also have vastly different agendas. A coach's long range goal is to produce skilled athletes who will contribute to a winning team. Team members generally are highly skilled, intensively motivated and completely voluntary in their participation. In contrast, the typical physical education class consists of pupils who are heterogeneous in skill, unevenly motivated and conscripted into participation. Each setting makes distinctive demands on the teacher or coach.

Absent from the experiential base of being a coach or a skilled athlete are sources of information about the needs of beginning level players, i.e., learning activities for students at that level, and organizational knowledge suitable for large numbers of heterogeneous students. Teachers who simply repeat what goes on in athletic practice run the risk of fostering inactivity, unrealistic expectations, and student frustration. It was only to be expected that GPE teachers in this study would rely heavily on game playing as a main activity in their classes, and so they did.

"Scrimmaging" represented one of the few activities these teachers could successfully transfer from their coaching and playing experience that would keep their students busy and happy.

Teaching Perspective. All four trained participants in this study had undergone formal teacher education. In addition, the two experienced teachers were seasoned veterans of public schools. Their overall objective as teachers is to

develop physical skills in students who generally are beginners. Unlike coaches, they try to instill basic approach tendencies in students who may be less receptive to developing physical skills than athletic team members.

Teachers have broader agendas than coaches. They therefore need to develop a knowledge base that goes beyond the content being taught. Their goals include not only the short term improvement of skills that coaches often seek, but also the longer term development of a belief structure that values activity beyond the confines of a class. This typical teacher's agenda requires attention to, and knowledge about, learners and learning environments that coaches usually regard as unimportant.

The certified teachers in this study tended to evaluate the class they saw on videotape in terms of its impact on student motivation to continue learning, while the untrained teachers, with their coaching perspective, evaluated the learning experience strictly in terms of skill acquisition. In sum, although trained and untrained teachers noticed and talked about learners, the nature of their comments were heavily influenced by their teaching or coaching perspectives.

Expert/Novice Knowledge

Recent research (Berliner, 1988; Borko & Livingston, 1989; Carter et al., 1988) has shown a clear difference in the knowledge structures possessed by expert and novice teachers. Novices have a less developed understanding of the

various forms of knowledge from which to draw. They rely more on established teaching routines and tend to teach in a more "scripted" fashion with little deviation from a structured lesson plan. Expert teachers tend to have more sophisticated and integrated teaching knowledge that allows them to instruct in a more interactive style, adapting their teaching behaviors to specific classroom situations as they emerge.

The participants in this study displayed a similar knowledge pattern. Though not classifiable as "experts", the veteran teachers evinced a greater understanding of the teaching process. This was no doubt influenced by the weight of their greater teaching experience.

A suggestive contrast was apparent among novice teachers. Trained novices, while not fully developed, had their formal training as a source for teaching knowledge. Untrained novices, on the other hand, had only their experiences as students and athletes. As a result, these untrained novices struggled with their roles as teachers. They regarded themselves primarily as students who just happened to have the responsibility of organizing and managing a group of fellow students. They had no source from which to develop an understanding of their roles as facilitators of skill acquisition.

Implications

Teacher Education

In addition to reaffirming the powerful influence of training and experience on teacher development, this study underscored several aspects of teacher preparation in physical education that should be reexamined. First, teacher education programs should include components that are better designed to address the problem of learning the pedagogical demands of subject matter. As Marks (1990) points out in his discussion of professional preparation for math teachers, schools of education have traditionally separated content from methods courses. This unintegrated approach tends to produce teachers who are familiar with general educational principles and who may develop a high level of performance competency in the content area of their discipline. What is missing, however, is intensive training in the application of teaching principles to the specific subject matter being taught.

In physical education, a dilemma lies in the fact that teachers are expected to provide instruction in a wide variety of physical activities. The traditional view holds that prospective teachers should take a large number of activity courses so that they can learn physical skills for themselves. They are then expected to combine this performance knowledge with the teaching knowledge gleaned from education courses. The flaw in this plan is that it does not take into account the subject specificity involved

in teaching. Understanding common errors and appropriate learning activities varies greatly among the multitude of sports that constitute a traditional physical education curriculum. While most trained physical education teachers can rely on well developed organizational skills to maintain the appearance of high activity, the quality of teaching and learning in many physical education classes is suspect.

To help insure that prospective physical education teachers adequately learn how to teach the content in their discipline, I propose a model for training in physical education that would restructure current educational methods classes and link them more closely to content areas. A physical education trainee would select a core of activity courses to be taken continuously over two years. Volleyball, for example, would be offered sequentially over four semesters. During the first semester the class would stress basic skill acquisition and development. In the second semester more advanced skills and game strategies would be introduced. During the third and fourth semesters, prospective teachers would involve themselves in learning how to teach volleyball. This would involve skill analysis training, planning, micro-teaching, management, and curriculum design - all this for the sport of volleyball.

Any such plan would call for the elimination of traditional methods courses and the absorption of their content into the intensive two-year activity sequence. In addition, the quantity of one semester activity courses taken

by physical education majors would be reduced so as to accommodate the in-depth learning of a core curriculum of physical skills. This reduction in the quantity of activity courses would allow program planners the opportunity to offer sport skills classes for a more extended period of time.

Staff Development

One issue that the results of this study raised was the need for inservice teacher training for college activity instructors. While perhaps not true in all instances, the cases of the two untrained novice instructors indicate that simply knowing how to perform an activity at a highly proficient level is not enough to develop a significant fund of knowledge about effective teaching. There also is no evidence to indicate that unsupervised teaching experience, what some may call on-the-job-training, will give activity instructors the necessary knowledge base to develop their pedagogical skills.

One model that would serve to improve the learning process for these untrained teachers involves team teaching with a junior or senior physical education major. If an individual with an awareness of such general education principles as planning, class organization, and assessment was able to co-teach a G.P.E. class with a content specialist, a perfect blending of knowledge resources could be achieved. Under the supervision of a physical education faculty member, this team could meet regularly to assess,

plan, and utilize class videotapes as the basis for analysis and reflection.

With this model, all parties concerned have the potential to benefit. The untrained content specialist could gain some valuable teaching information that was previously unavailable. Prospective physical education teachers could have a valuable teaching experience and the opportunity to increase their content knowledge through interaction with a specialist.

Research

There are several extensions of this study that would be worth pursuing. First, it would be interesting to explore the correlation between knowledge development and actual teaching behaviors. Based on an earlier pilot study of untrained teachers, there was some indication of a disparity between what some teachers identified as effective teaching and what they actually did as teachers. In some cases they admittedly contradicted themselves. Thus, some teachers fail to act on their knowledge. Investigating the causes for this phenomenon could yield valuable findings.

Also, to inform pre-service program design, it would be useful to gather data about differences in knowledge among prospective teaching candidates. Members of that group were not included in the participant pool for this study, but identifying what they already know would seem to be a critical first step in the design and implementation of learning components for teacher preparation.

Finally, it will be important to gather more information about pedagogical content knowledge in physical education. Clear definitions must be established and specific content developed for each activity area in physical education. This form of knowledge, unique to teaching, has the potential to create a strong theoretical and practical foundation for the development of more effective teachers.

APPENDIX A
BACKGROUND QUESTIONNAIRE

BACKGROUND QUESTIONNAIRE

1. Age: _____ Years
2. Sex: _____ Male _____ Female
3. Education: _____ Degree _____ Major _____ Year of graduation
_____ School
4. Teaching experience. Please list all sports and physical activities you have taught, how long you have taught them and the setting in which they were taught:

<u>SPORT</u>	<u>YEARS TAUGHT</u>	<u>SETTING</u> (High School, College, Other)
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5. Have you ever coached a sport?
Circle one: 1. Yes 2. No

If yes, please list the sports, length of time you coached, and the level at which you coached.

<u>SPORT</u>	<u>YEARS COACHED</u>	<u>LEVEL</u> (High School, College, Other)
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6. Have you ever played on an organized athletic team at any time in your life?

Circle one: 1. Yes 2. No

If yes, please provide the information requested below.

Sport	Level =	High School	Starter	# of years
		College	or sub?	you
		Club		participated?

Did you or your teams receive any awards? (most valuable, captain, most improved, league champions, etc.).

7. Have you ever participated in intramural sports, clubs, leagues, or youth sports programs?

Circle one: 1. Yes 2. No

If yes, please please list the programs

SPORT

PROGRAM

PLACE

8. Do you participate in a sport or physical activity, not associated with any program, on a regular basis? If so, what is the activity and how often do you do it?

ACTIVITY

FREQUENCY

9. Did either of your parents ever participate in high school or college varsity sports?

Circle one: 1. Yes 2. NO

If yes, please list the sports

Mother
Sports:

Father
Sports:

10. Do you have any brothers or sisters? If so, do they participate in sports or other physical activities (past or present)? Please list:

Brother
Sports:

Sister
Sports:

11. Have you ever held any supervisory roles? (recreation leader, camp counselor, etc.)

If so, please list:

12. Have you ever had any specific, formal instruction on how to teach or coach a sport that was not associated with your undergraduate studies? (clinics, certification classes, etc.)

1. Yes 2. No

If yes, please describe each instance:

Type of Instruction

Approximate Date

APPENDIX B
SESSION ONE INTERVIEW GUIDE

SESSION ONE INTERVIEW GUIDE

I will ask each participant to view a twenty minute videotaped volleyball lesson two times and think-aloud about what they see. During the first viewing, I will give each the following instructions:

"Talk about what you are seeing as you observe this lesson. You are free to comment on anything which catches your attention. You may express your thoughts in any way you choose. There are no right or wrong observations nor are there things to which you should or should not attend."

If participants ask if they can critically evaluate the lesson I will tell them to describe the lesson in anyway they feel comfortable.

During the second viewing the tape will be stopped at points previously identified by the participant and I will ask them to explain why they thought them noteworthy.

At the end of the second viewing I will ask the following questions to begin to probe for teaching knowledge:

1. Do you think the teacher has a thorough understanding of the sport of volleyball?

On what bases did you make that judgement? What did you see or hear that convinced you?

How important are those for effective teaching?

2. Do you think the teacher has a thorough mastery of the skills of effective teaching?

On what bases did you make that judgment? What did you see or hear that convinced you?

3. How did the students react to this lesson?
4. Did you consider this lesson as a learning experience for the students? Why? or Why not?
5. Were these beginner, intermediate, or advanced students?
How could you tell?
6. In what ways was this an effective or ineffective lesson?
7. What do you think the instructors' teaching goals were?
Did she meet them? How could you tell?
8. Whose responsibility is it for learning an activity?
9. As a teacher, would you do anything differently with that class?

APPENDIX C
SESSION TWO INTERVIEW GUIDE

SESSION TWO INTERVIEW GUIDE

I will give each participant a typed transcript of their first session talk aloud interview and I will probe for both influences on the sources of their teaching knowledge and awareness of teaching principles and practices related to pedagogical content knowledge.

Line of questioning for influences on the sources of teaching knowledge:

1. Talk to me for a few minutes about the people or activities you feel have most influenced you as a teacher.
2. During our last session you noticed _____ (Teaching Theme). Would you please elaborate a little on that?
3. How do you incorporate _____ (Teaching Theme) in your own teaching?
4. Can you think back and identify what influenced you the most in developing your knowledge and ability concerning _____ (Teaching Theme).

(Questions repeated as many times as necessary to cover number of themes drawn from first session).

Line of questioning for teaching knowledge. Some questions from session one may be repeated for the purposes of clarification and elaboration:

1. Are there any activities with which you aren't that familiar that you could teach effectively?

2. If you were assigned an activity to teach that you weren't familiar with, how would you go about preparing to teach it?
3. Is there any connection between a person's ability to perform an activity and that person's ability to teach it? Please explain.
4. Does a person need anything beyond performance knowledge to teach well? If Yes, please elaborate.

APPENDIX D
CONSENT FORM

CONSENT FORM

"Learning to Teach"

I. My name is Daniel Rosenberg and I am a graduate student in the Department of Professional Preparation for Physical Education at the University of Massachusetts in Amherst. I am doing research which will be based on interviews with activity instructors and physical education teachers in Western Massachusetts.

II. You are being asked to participate in this study. I will conduct two interviews with you. The first will be approximately one and a half hours in length and will involve viewing a videotaped volleyball lesson. You will be asked to describe what you see and then answer questions related to various aspects of the lesson. To refresh your memory and serve as a guide for the second interview, you will receive a transcript of selected quotes from the first interview. The second interview will be conducted within ten days and will be approximately one hour in length. It will focus on issues related to the first session and your development as a teacher.

III. The interviews will be audio taped and later selectively transcribed by myself or a professional secretary. My goal is to analyze the materials from the interviews (you will be one of 8 participants) and to use them to develop an understanding of the factors that influence how individuals acquire teaching knowledge. This understanding would be used in:

- (a) my dissertation,
- (b) journal articles,
- (c) presentations to professional groups,
- (d) other purposes related to my work as a teacher educator.

In all written material and oral presentations in which I may use materials from your interviews, I will use neither your name, names of people mentioned by you, nor the name of your school, school system, or institution for which you work. Transcripts will be typed with pseudonyms substituted for all names. Every effort will be made to protect your anonymity.

IV. While consenting at this time to participate in these interviews, you may at any time withdraw from the actual interview process.

If you need to contact me at any time please call the University during the day at (413) 545-2323. If I am not available please leave a message with the secretary and I

will return your call. In the evening, I can be reached at (413) 665-8158.

V. Once the study is complete a summary of the dissertation will be mailed to you.

VI. In signing this form you are agreeing to the use of the materials from your interviews as indicated in III. If I wish to use the materials from your interview in any ways not consistent with what is stated in III, I will contact you to explain and request your further consent.

VII. In signing this form, you are also assuring me that you will make no financial claims for the use of the material from your interviews.

I, _____, have read the above statement and agree to be interviewed under the conditions stated above.

Signature of participant

Date

Investigator

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