THE TYPES, SOURCES, AND PERCEIVED RELEVANCE OF KNOWLEDGE ACQUISITION, AND THE ENACTED EFFECTS WHEN TEACHING UNFAMILIAR AND FAMILIAR PHYSICAL EDUCATION CONTENT

DISSERTATION

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By

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*****

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ABSTRACT

Pedagogical content knowledge (PCK) has been shown to be important to the work of teachers. Research conducted in physical education has shown the development of PCK is important to the pre-service physical education teacher for three reasons: teachers report they feel more competent in their abilities when they possess pedagogical content knowledge; undergraduates generally do not possess enough pedagogical content knowledge; and developing pedagogical content knowledge is often problematic. To gain more insight into the how PCK develops in pre-service teachers, the purpose of this investigation was to examine and describe knowledge development in student teachers during a secondary, physical education teaching internship when the student teachers were teaching content they perceived themselves to be unfamiliar and familiar. The focus of this investigation was on the types, sources, and perceived relevance of the knowledge two student teachers acquired, and the enacted effects of their knowledge, as they learned to teach a unit of content in which they felt they had either little or extensive knowledge and experience. Data were collected qualitatively via formal and informal interviews, non-participant observations, document analysis, stimulated recall using videotaped classes, and conference analysis. Findings indicated that knowledge of content is crucial to the development of PCK. Throughout the internship, participants acquired various types of knowledge. For example, various components of subject matter
knowledge, general pedagogical knowledge, PCK, and knowledge of context were acquired. Participants acquired knowledge through a variety of sources. These included books, cooperating teachers, past experiences as students, a teaching peer, their disciplinary background, professional coursework, and daily teaching experience. There were differences in the degree to which the participants were able to develop PCK when their content knowledge was limited, and this limitation affected the delivery of lessons.
Dedicated to my mother
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CHAPTER 1

INTRODUCTION

During the mid 1980’s, government reforms were calling for the professionalization of teaching. Advocates of this reform argued that teaching was based on the possession of a particular knowledge base, and it was upon this knowledge base that teacher education programs, and the state evaluation of teachers, should be framed. In response to these reform cries, Shulman (1986, 1987) argued that the particular knowledge base required for teachers had never been specified. Thus, he began an inquiry into the conceptions of teacher knowledge.

The inquiry began with the perusal of past state examinations that were used to certify teachers. Shulman (1986) found that these examinations focused mainly on content with a disregard for pedagogy or they placed a heavy emphasis on pedagogy at the expense of content. At the time of these writings, the research focus in education was on the pedagogy of teaching. According to Shulman (1986), components that were absent from the literature, were questions about how teachers teach their content. For example, how does a teacher transform content knowledge into ways that students will be able to understand? Shulman (1986) saw this as a serious omission and proposed that to fully understand the complexities of teaching, both content and pedagogy must be studied together. For a thorough study of the content/pedagogy relationship the domains and
categories of knowledge that teachers possess must begin to be explored. One such
domain - content knowledge in teaching was initially proposed as a way to begin thinking
about how content knowledge is developed in teachers.

Shulman (1986) divided the ‘content knowledge in teaching’ domain into three
categories of content knowledge - subject matter content knowledge, curricular
knowledge, and pedagogical content knowledge. Each will be described separately.

Subject matter content knowledge referred to, “the amount and organization of
knowledge per se in the mind of the teacher” (p. 9). Content knowledge involved more
than simply knowing facts or concepts of a particular domain. It required that the teacher
possess a deeper understanding; the teacher must be able to explain why certain things
were as they were, what content was important, and why various concepts were important
to the discipline.

Curricular knowledge involved possessing a full understanding of the curricular
materials available to the teacher to aid instruction, such as alternative texts, films, and
software. An additional aspect to curricular knowledge included understanding other
curricular materials used by students outside the teacher’s class, for example, what were
students studying in other classes?

Pedagogical content knowledge referred to, “the ways of representing and
formulating the subject that make it comprehensible to others” (p. 9). Various ways of
representing content include, but are not limited to, analogies, illustrations, examples,
explanations, demonstrations, and the use of metaphors. Making content comprehensible
to others implied that the teacher understood what made learning some topics easy and
others difficult. Such understanding would enable the teacher to develop specific
strategies to present content in a manner that would help students overcome these
difficulties (transform misconceptions into understanding). In a subsequent paper,
Shulman (1987) outlined four additional categories of teacher knowledge. These were:

- general pedagogical knowledge, which included, “those broad principles and
  strategies of classroom management and organization that appear to transcend
  subject matter” (p. 8);
- knowledge of educational contexts, which encompassed the, “workings of the
  group or classroom, the governance and financing of school districts, to the
  character of communities and cultures” (p. 8);
- knowledge of learners and their characteristics; and
- “knowledge of educational ends, purposes, and values, and their philosophical
  and historical grounds” (p. 8).

According to Shulman (1987), pedagogical content knowledge is the
primary category of interest for teachers, for teacher educators, and those studying
teaching, because,

...it identifies the distinctive bodies of knowledge for teaching. It represents
the blending of content and pedagogy into an understanding of how particular
topics, problems, or issues are organized, represented, and adapted to the
diverse interests and abilities of learners, and presented for instruction.
Pedagogical content knowledge is the category most likely to distinguish the
understanding of the content specialist from that of the pedagogue (p. 8).

Shulman’s initial writings (1986, 1987) indicated that teaching goes beyond
possessing knowledge and understanding of content or knowing about basic
pedagogical skills. Effective teaching involves the ability to transfer, communicate,
combine, and implement both types of knowledge to students in such a manner that students comprehend it.

Following Shulman’s (1986, 1987) initial writings on the nature of teachers’ knowledge, several research projects were undertaken in various curriculum fields to more fully explore the knowledge base of teachers. For example, studies were conducted in mathematics (Ball, 1991; Ball & McDiarmid, 1990; Carpenter, Fennema, Peterson, & Carey, 1988; Even, 1993), English (Grossman, 1990; Grossman, Wilson, & Shulman, 1989; Gudmundsdottir, 1991), and social studies (Gudmundsdottir, 1990). Much of this research demonstrated that inexperienced and novice teachers have an incomplete repertoire of pedagogical content knowledge. Early researchers found that neophyte teachers often did not possess the ability to extract information from a text and transform it into content that was comprehensible for students.

From the initial research that began to explore the knowledge base of teachers, researchers developed expanded models of teacher knowledge (Elbaz, 1983; Leinhardt & Smith, 1985). Based on an examination of the existing models, Shulman’s (1986, 1987) work, and her own research, Grossman (1990) noted that out of these models “four general areas of teacher knowledge can be seen as the cornerstones of the emerging work on professional knowledge” (p. 5). These four areas of teacher knowledge include, subject matter knowledge, general pedagogical knowledge, pedagogical content knowledge, and knowledge of context. Grossman’s (1990) model of teacher knowledge is the most widely used model of teacher knowledge at this time (Graber, 1995, Schempp, Manross, Tan & Fincher, 1988).
Several studies have highlighted the importance of subject matter knowledge to the development of pedagogical content knowledge. The subject matter of physical education is activity (volleyball, soccer, creative dance, social dance, square dance, gymnastics, tennis, etc.). Since Franklin Henry’s suggestion in 1964 that physical education become more of an academic discipline (Siedentop, 1989) students are being required to take fewer and fewer activity courses during their teacher preparation programs (Corbin & Eckert, 1990; Rovegno, 1995a; Siedentop, 1989). Instead of activity courses, students are required to take more courses ‘about’ physical education; courses like the history of sport, the psychology of sport, and the physiology of sport, to name a few (Siedentop, 1989). The effect of this lack of activity training has resulted in some student teachers beginning their teaching career with a limited knowledge base in the content they will be required to teach (Locke, 1977; Rovengo, 1995). With limited content knowledge, the development of pedagogical content knowledge will be hindered (Rovegno, 1995). If pedagogical content knowledge is required for quality instruction and if it’s development is hindered by lack of content knowledge, it would seem imperative to examine if and how teachers gain such knowledge when their content knowledge is weak and what the impact of their knowledge, or lack of knowledge, has on students and the pre-service teacher.

There have been a number of studies that have explored the development of knowledge in pre-service teachers as they are learning to teach. In the field of physical education, Rovegno (1991, 1992a, 1992b, 1993, 1994, 1995) has completed the majority of research in this area. Her work has focused on physical-education,
teacher-education students who were learning a new curricular approach to teaching physical education, namely, the movement approach (Rovegno, 1991, 1992a, 1992b, 1993). Rovengo’s research has found that pre-service teachers equate telling with learning (1991), focus on the activity but not the content of the activity (1992), and assume students will learn strategy by playing the game (1993). Other researchers have examined the development of knowledge acquisition using different participants, for example, an experienced high school teacher (Schempp, 1995) and experienced elementary generalist teachers (Walkwitz & Lee, 1992). The experienced teacher drew on experience, current interests, observations of other teachers, resource availability and student interest to acquire the knowledge necessary to teach (Schempp, 1995). The experienced elementary generalist teachers were able to improve their ability to structure learning activities to produce student learning. (Walkwitz & Lee, 1992). Little research has examined the pre-service secondary teacher learning to teach traditional content.

As Marks (1991) pointed out one of the characteristics of pedagogical content knowledge is that it is highly contextualized. That is, the knowledge required to teach a specific subject differs with the subject and the grade level of the students. Thus, the specific knowledge required to teach elementary physical education will differ from the specific knowledge required to teach secondary physical education, which in turn differs from the knowledge required to teach other subject areas. Generally speaking, highly contextualized material is best developed and thus studied in a natural environment (Marks, 1991). According to Marks (1991), “This argues that
pedagogical content knowledge is best developed in clinical settings, from student teaching on into novice teaching” (p. 8).

Despite the work that has been done in physical education, after reviewing the research on the development of pedagogical content knowledge, Rovegno (1995a) stated that the research to date indicates that it’s development is important to the pre-service teacher for three reasons. First, teachers report they feel more competent in their abilities when they possess pedagogical content knowledge. Secondly, undergraduates generally do not possess enough pedagogical content knowledge. Thirdly, for the pre-service teacher, developing pedagogical content knowledge is often problematic. With these conclusions, it appears that further study into the development of pedagogical content knowledge in pre-service teachers is warranted.

Statement of the Problem

The purpose of this investigation was to examine and describe knowledge development in student teachers during a secondary, physical education teaching internship, when the students were teaching content they perceived was unfamiliar and familiar content. The focus of this investigation was on the types, sources, and perceived relevance of the knowledge student teachers acquired, and the enacted effects of their knowledge development, as they learned to teach a unit of content in which they felt they had either little or extensive knowledge and experience.

Research Questions

What influences the development of pre-service teachers’ pedagogical content knowledge (PCK) during a secondary physical education teaching internship? More specifically, the following four research questions will be addressed:
R.Q.1. During a secondary physical education teaching internship, what are the types, sources, and perceived relevance of knowledge acquisition when teaching content perceived to be unfamiliar?

R.Q.2. What are the enacted effects of knowledge acquisition on the student teacher and/or students when teaching content perceived to be unfamiliar?

R.Q.3. During a secondary physical education teaching internship, what are the types, sources, and perceived relevance of knowledge acquisition when teaching content perceived to be familiar?

R.Q.4. What are the enacted effects of knowledge acquisition on the student teacher and/or students when teaching content perceived to be familiar?

Significance of the Study

Pedagogical content knowledge is the distinctive body of knowledge that teachers possess and use to transform content into forms that are understandable to students (Shulman, 1986). This body of knowledge has been shown to be important to the work of teachers (Marks, 1991; Rovegno, 1991, 1992a, 1995). The importance of this body of knowledge has lead researchers to investigate potential sources and contributions of its development. This study investigated the contributions of various knowledge sources on the development of pre-service teachers’ pedagogical content knowledge as they learned to teach a unit of unfamiliar and familiar content. Through such an investigation, it is hoped that the findings will further our understanding of the impact of potential sources of pedagogical content knowledge and its effect on the pre-service teacher. Since pedagogical content knowledge has been shown to be important to the work of teachers, examining sources where teachers gather their knowledge, the relevance of such
knowledge acquisition, and the effect of such knowledge acquisition on students will contribute to the current literature on how student teachers learn to teach.

Limitations

This study was limited by the following factors. The first limitation was time spent in the school site. The researcher was only in the site during those times when the participants were teaching the focus unit of study. The units taught ranged in length from 1 week to 5 weeks. For one participant, the one-week unit was actually one 3-day unit and one 2-day unit. Also, the student teaching experience was a busy time for the participants. As a result, although it would have been ideal to have been able to spend an unlimited amount of time talking with the participants before and after their lessons, this was not always possible as they often had other classes to teach or other commitments to attend to (for example, study hall). Therefore, the time available to spend with the participants after each observation varied from five minutes, up to one half hour, depending upon the participants’ commitments and teaching load. Furthermore, this study was conducted during the last five weeks of a 10-week spring quarter of study that followed two previous quarters of heavy workload. During informal conversations, the participants often commented how ‘burnt out’ they were feeling and how much they were looking forward to the term being over. Thus, it is possible that the participants may not have been as vocal as they may have been if the study had been conducted earlier in the participants’ program.

Another limitation involved the participants’ ability to verbalize their thoughts and put their thoughts and actions into words. It is possible, that at times, the participants did not possess the vocabulary, or did not know how to accurately express the message
they intended. Also, the study was limited by the ability of the stimulated recall procedure to actually elicit accurate thoughts relative to the video clip being shown. More specifically is the ability of the stimulated recall procedure to elicit tacit knowledge. For example, there may have been behaviors the participants engaged in ‘automatically’ and they have forgotten why they behave in such a manner. (Calderhead, 1981). There was also the possibility of the participant verbalizing what they thought the researcher wanted to hear (McConnell, 1985). That is, although they were strongly encouraged to speak freely, the participants may have thought there was a ‘right’ answer and may have attempted to provide such an answer.

Finally, this study was limited by the kinds of questions the researcher asked the participants. The kinds of questions the participants were asked and subsequent discussions focused on the immediate context in which they were teaching, and not the larger context of physical education in general or it’s place in the educational system.

Delimitations

The delimitations of this study include selection of participants, participant numbers, site, and content taught. First, the students in this study were selected specifically because they were required to teach familiar and unfamiliar content. Second, the study took place in schools with cooperating teachers who agreed to work with student teachers. Third, the two students and their cooperating teachers who participated in this study readily volunteered. Lastly, the student teachers were required to teach the content as it was part of the cooperating teachers’ assigned workload. Due to the above delimitations, the results of this study will not generalize to other teachers, pre-service teachers, settings, or content areas.
Definition of Terms

Pedagogical content knowledge -

... the most regularly taught topics in one’s subject area, the most useful forms of representation of those ideas, the most powerful analogies, illustrations, examples, explanations, and demonstrations – in a word, the ways of representing and formulating the subject that make it comprehensible to others. [It] also includes an understanding of what makes the learning of specific topics easy or difficult: the conceptions and misconceptions that students of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons. If those misconceptions are misconceptions, which they so often are, teachers need knowledge of the strategies most likely to be fruitful in reorganizing the understanding of learners (Shulman, 1996, p. 9-10).

Knowledge of content - also known as content knowledge, refers to the “‘stuff’ of a discipline: factual information, organizing principles, central concepts”

(Grossman, Wilson, & Shulman, 1989, p. 27).

Substantive structures of a discipline - “the various paradigms within a field that affect both how the field is organized and the questions that guide further inquiry”

(Grossman, 1990, p. 6).

Syntactic knowledge - knowledge about how to conduct inquiry within the discipline


Learners and learning – refers to general knowledge about learners and how they learn


Classroom management – the rules and routines the teacher uses to conduct orderly classes.

Curriculum and instruction - general principles of teaching and learning such as academic learning time, wait time, and group work.

‘Other’ component included in the general pedagogical knowledge category includes
“knowledge and beliefs about the aims and purposes of education” (Grossman, 1990, p.6).

Conceptions of the purposes for teaching subject matter - includes “what is most important for students to know, understand, and appreciate about specific content, and their understanding of the interrelationship of topics within a subject” (p. 209).

Knowledge of students’ understanding – “knowledge about the conceptions and misconceptions of particular topics in a subject matter” (Grossman, 1990, p. 8).

Curricular knowledge - “knowledge of curriculum materials available for teaching particular subject matter, as well as knowledge about both the horizontal and vertical curricula for a subject” (p. 8).

Knowledge of instructional strategies and representations for teaching particular topics - the various metaphors, explanations, activities, etc., that teachers use to make the subject matter easier to understand for students (Grossman, 1990).

Curricular knowledge - “knowledge of curriculum materials available for teaching particular subject matter, as well as knowledge about both the horizontal and vertical curricula for a subject” (p. 8).

Knowledge of context: students - refers to the specific characteristics of a particular group of students.

Knowledge of context: community – refers to the community interests and values surrounding the school in which the participant is teaching.

Knowledge of context: district - includes awareness of the “opportunity, expectations and constraints, posed by the district” (Grossman, 1990, p. 9), and the governance and financing of school districts (Shulman, 1987).
Knowledge of context: school - knowing about any contextual factors that may influence instruction, for example the school culture, and departmental guidelines (Grossman, 1990).

Knowledge sources – all people and objects that provide information to student teachers intended to aid their understanding and ability to teach physical education.
The purpose of this investigation was to describe and examine the types, sources, perceived relevance, and enacted effects of knowledge that student teachers acquired during a secondary teaching internship when they were teaching content they perceived to be unfamiliar and familiar. This chapter will begin by outlining the theoretical framework or model of teacher knowledge, developed as a result of previous research, that will be used throughout the study. Following this, research, which has focused on the development of pedagogical content knowledge in physical education, will be presented.

Theoretical Framework

Early research in education focused on identifying teacher behaviors that were related to student achievement (Shulman, 1986). When this research was incorporated into teacher preparation programs, the results were prescriptive. Teachers were taught behaviors that should be consistently incorporated into their teaching. The effect on teacher education suggested a number of behaviors that teachers needed to master to demonstrate good practice. This early research neglected the role of teacher knowledge and how this knowledge informed practice (Shulman, 1986). For example, the use of cues and effective demonstrations are teacher behaviors that research has shown
contribute to student learning in physical education (Rink, 1998). A physical education teacher may be able to recite why cues are important, feel strongly about using them in his or her lessons, and be able to describe how an effective demonstration should be performed and points to remember when demonstrating. But, for the physical education teacher who lacks the appropriate content knowledge about the activity, it is unlikely that he or she will be able to identify appropriate cues and conduct an effective demonstration stressing the critical aspects of various skills.

Researchers have begun to investigate the underlying knowledge that informs teachers’ practice. In an effort to study the knowledge base of teaching, several researchers have developed models of teacher knowledge (Elbaz, 1983; Leinhardt & Smith, 1985; Shulman, 1986, 1987). Examining these models, Grossman (1990) noted that, “four general areas of teacher knowledge can be seen as the cornerstones of the emerging work on professional knowledge” (p. 5). These four general areas of teacher knowledge include, subject matter knowledge, general pedagogical knowledge, knowledge of context, and pedagogical content knowledge. Each general area of knowledge is further divided into three or four knowledge components. For a visual description of Grossman’s (1990) model of teachers’ knowledge, see Appendix A.

Research examining the development of knowledge and pedagogical knowledge has been conducted in physical education using either Grossman’s (1990) or Shulman’s (1996, 1997) definitions. Both models provide general descriptions of each of the knowledge areas and components. Grossman (1990) provided examples of types of knowledge found in each area and component but her examples related to English. When definitions have been provided in the physical education knowledge research,
Grossman’s general descriptions have been used. What follows is a description of each general area and the components contained within each general area using the initial descriptions provided by Grossman’s (1990). In an attempt to clarify the knowledge areas and components, specific physical education examples and or information that ‘fits into’ each component will also be presented.

Subject Matter Knowledge

Subject matter knowledge is the first general knowledge area to be discussed. There are three components that comprise a teacher’s subject matter knowledge. These are: knowledge of content, the substantive structures of a discipline, and the syntactic structures of a discipline.

Subject Matter Knowledge: Content Knowledge

Knowledge of content, what is also known as content knowledge, refers to the “stuff” of a discipline: factual information, organizing principles, central concepts” (Grossman, Wilson, & Shulman, 1989, p. 27). Individuals possessing content knowledge can “identify, define, and discuss these concepts separately, ...and can identify relationships among concepts in a field as well as relationships to concepts external to the discipline” (Grossman, et al., 1989, p. 27). Describing the content of physical education, Siedentop (1989) stated the teacher of physical education,

Should know the technical aspects of the skills involved, the strengths and weaknesses of various strategic approaches to the sport, the training implications for improved performance within the sport, the developmental considerations, the norms, values, and traditions of the sport, the role it does and should occupy in local and national sport cultures, the developing technologies within the sport, the psycho-social considerations associated with individual and group dynamics of players, and the ethical/moral dilemmas posed by competition. And, they should “know” these things intellectually and as performers…(p. 12)
In teaching, it is important that teachers possess adequate content knowledge because the depth of a teachers’ content knowledge can affect their teaching. For example, research in English and science has shown that when teachers lack appropriate content knowledge, they may opt out of teaching the content altogether or when this is not possible, they tend to over rely on a textbook that they are unable to adequately critique. Teaching style may also be affected when teaching unfamiliar content. For example, teachers have been known to rush through unfamiliar content and avoid student questions (Grossman, et al., 1989).

According to Rovegno (1995) and Siedentop (1989), physical education teacher education students lack an appropriate amount of content knowledge. The result of this lack of knowledge affects the student’s ability to teach. For example, when content knowledge is limited, pre-service teachers focus on teaching an activity but not the content within the activity, and they are often unable to relate or describe how the various activities they teach are linked to the major goals of physical education. Furthermore, knowledge of content can affects how teachers structure the content. For example with limited content knowledge, students are likely to teach skills of various games to students but not the strategies required to play the games (Rovegno, 1995).

As was previously stated, subject matter knowledge consists of three components, and content knowledge is only one of these. Substantive and syntactic structures are necessary to guide the discovery and acquisition of new content knowledge (Grossman, et al, 1990).
Subject Matter Knowledge: Substantive Structures

The substantive structures of a discipline are defined as “the various paradigms within a field that affect both how the field is organized and the questions that guide further inquiry” (Grossman, 1990, p. 6). Schwab (1978) has defined the substantive structures as “the conceptual devices which are used for defining, bounding, and analyzing the subject matters [the scholar] investigate[s]” (p. 246). Schwab (1978) continued by stating, “thus, we would look for differences of structure which arise when different scientists use different conceptions of their subject matter to guide enquiries” (p. 246). Drawing “from a larger survey of structural and conceptual alternatives in teacher education” (Feiman-Nemser, 1990, p.6). Feiman-Nemser (1990) presented five different educational orientations that “highlight some of the traditions of thought and practice that have characterized the field” (p.6). The five different conceptual orientations include the academic, practical, technological, personal, and critical/social orientations. The academic orientation focuses on teaching as the transmission of knowledge. The technological orientation focuses on teachers mastering and being able to apply a set of research based teaching practices in a classroom. The practical orientation focuses on the importance of practical experiences, interactions with peers and mentors, as well as general exposure and initiation to teaching theory in order for the teacher to be able to respond appropriately to daily situations that arise in the classroom. Self-understanding and personal development are the focus of the personal orientation. The critical/social orientation focuses on the teacher as “political activist”, working for a more democratic social order. Rink (1993) provided a description of what the general education
orientations would emphasize in physical education. For example, in physical education, teacher educators and teachers working from a mainly academic orientation would emphasize subject matter knowledge such as games, sports, dance, and fitness whereas teacher educators and teachers subscribing mainly to a technological orientation would emphasize teacher effectiveness skills and research based teaching skill development. The critically/socially-oriented teacher would focus on the moral obligations of teachers and address equity issues and inclusion. As Rink (1993) stated, “as is the case with most curricular orientations, different emphases exist because people hold different values and because it is impossible for one program to attend to every dimension with the same emphasis (p. 316). Knowledge of a discipline’s substantive structures is important as it directly affects curricular decisions (Grossman, Wilson, & Shulman, 1989).

Subject Matter Knowledge: Syntactic Knowledge

The third component of subject matter knowledge is known as syntactic knowledge and refers to knowledge about how to conduct inquiry within the discipline. More specifically, the syntactic structures of a discipline “include an understanding of the canons of evidence and proof within the discipline, or how knowledge claims are evaluated by members of the discipline” (Grossman, 1990, p. 6). Schwab (1978) described these structures as “different methods of verification and justification of conclusions” (p.246). Rink (1993) described two competing paradigms that have dominated the direction of educational research. According to Rink, (1993) these are the quantitative paradigm that largely focused on correlation and process-product research, and the naturalistic or qualitative paradigm that stresses “the context-specific and situational nature of events and the multiple realities of the participants in events (p. 308).
Syntactic structures involve being able to acquire new knowledge by critically examining new information. Lack of the syntactic structures of a discipline will limit the teacher’s ability to “acquire new knowledge responsibly and critically” (Grossman et al., 1989, p. 30).

General Pedagogical Knowledge

The general pedagogical knowledge area is the name for a general body of knowledge that includes generic strategies and principles relating to teaching that transcend subject area. Included in this knowledge area are four components titled, learners and learning, classroom management, curriculum and instruction, and an ‘other’ category.

General Pedagogical Knowledge: Learners and Learning

The learners and learning component includes general knowledge about learners and how they learn. In order to meet the needs of students, teachers must have an understanding of the characteristics of children and the implications of these characteristics on the teaching and learning process. In physical education, several pedagogues (Gallahue & Ozmun, 1998; Kirchner & Fishburne, 1998; Pangrazi, 2001) have outlined a number of these characteristics and the resulting implications. For example, children between the ages of 6 and 10, tend to have relatively short attention spans and are fairly self-centered. Therefore, regardless of the content the early-years teacher is presenting, he or she must change the activity often to maintain interest and provide activities that allow students to practice individually or in small groups (Gallahue & Ozmun, 1998).

Other characteristics of learners that may influence how they learn are their level
or type of intelligence. Gardner (1993, p. 7) defined intelligence as the ability to “solve problems, or fashion products, that are valued in one or more cultural or community settings” (Gardner, 1993, p. 7), and acknowledged that learners have different strengths that contribute toward this ability. According to Gardner (1993) there are different types of intelligences. Originally (Gardner, 1983) Gardner suggested there were seven intelligences. These include logical-mathematical intelligence (logical, mathematical, and scientific ability), verbal-linguistic intelligence (the ability to manipulate words), spatial intelligence (the ability to form, maneuver within, and operate in a spatial world), musical intelligence (the ability to produce, understand, and appreciate melody and rhythm), bodily-kinesthetic intelligence (the ability to relate to and manipulate one’s own body), interpersonal intelligence (the ability to understand other people) and intrapersonal intelligence (the ability of the individual to form and accurate, truthful portrait of themselves). Later, Gardner (1999a) added an eighth intelligence, a naturalist intelligence (people highly attuned to the natural world), and also suggested (Gardner, 1999b) there may be other intelligences not yet found, for example moral intelligence.

With respect to learning, people learn in different ways or have preferred styles of learning. Sarasin (1998) defined a learning style as “the preference or predisposition of an individual to perceive and process information in a particular way or combination of ways” (p. 3). Researchers and academics have categorized learning styles in a number of different ways. For example Butler (1988) suggested learners can be classified as fitting into one or a combination of the following four learning styles, concrete, abstract, sequential, and random. Concrete learners prefer being physically involved in the learning process, for example using or manipulating real or concrete objects. Abstract
learners synthesize particular facts into a unified whole. Sequential learners require clearly outlined steps that are structured and arranged in a logical order. Random learners are more holistic and global in their learning, often finding order and structure to be a hindrance. Sims and Sims (1995) classified learning styles according to how an individual processes new information: cognitive, perceptual, behavioral, and affective. Cognitive learners process information by first acquiring and understanding smaller specific parts. The parts of a concept are necessary before the whole can be understood. Perceptual learners are opposite of cognitive learners in that they first need to see the whole of a concept and then they can begin to discover and understand the parts. The behavioral learner prefers to physically interact with the concept in order to fully understand the concept. The affective learner involves feelings and emotions when learning new information, preferring to learn by understanding all aspects of the concept. Sarasin (1998) has categorized individuals’ learning styles as auditory, visual, and tactile/kinesthetic. Auditory learners prefer to learn new material in small pieces of information presented orally. As the label implies, visual learners require visual aids to enhance the learning process. The visual aids can include drawings, charts, diagrams, or outlines. Tactile/kinesthetic learners prefer to be active participants in the learning process and can be described as learning by doing people. Kolb (1981) suggested there are four main processes people use when learning. These include concrete experiences (learning as the result of a direct experience), reflective observation (learning through observing others or thinking about experiences), abstract conceptualization (learning by creating theories to explain one’s observations) and active experimentation (learning by applying personally created theories to solve problems). According to Kolb, all people
use the previously described processes, but some to a greater degree than others. One's preference for a process is used to describe their learning style. Kolb’s learning styles include the accommodator, the diverger, the converger, and the assimilator. The accommodator is an action-oriented, hands-on learner. The diverger is a creative individual who is more feeling oriented in their learning, preferring group work, discussion, and the generation of ideas when learning. The assimilator is often labeled the ‘thinker’ and is one who prefers working alone or with one other, preferring reading and listening when learning, and integrates the parts into the whole. The converger is a problem solver who prefers working alone or in small groups, determining goals and then working to achieve the goals. What has been presented above is by no means an exhaustive list of all the different learning styles. Rather what has been presented is meant to show that various researchers have studied how people learn and have created a number of theories. It is evident from the above brief descriptions that although researchers may have labeled various learning styles with different names, there are common threads amongst them.

 Recently, Silver, Strong, and Perini (2000) have suggested the multiple intelligences and learning styles are integrated. According to the authors, “clearly, learning styles and multiple intelligences need one another. Without multiple intelligences, learning styles cannot fully account for the content of learning. Without learning styles, multiple-intelligence theory is unable to account for different processes of thought and feeling” (p. 41).

 Multiple intelligences and learning styles become important as such knowledge becomes essential for planning effective lessons. The authors stressed this point when
they stated, “through the fusion of learning styles, multiple intelligences, and effective lesson planning and implementation, teachers can promote the highest levels of active, in-depth learning in the classroom while also making success a reality for every student” (Silver, Strong, & Perini, 2000, p. 49).

**General Pedagogical Knowledge: Classroom Management**

A second component of general pedagogical knowledge is classroom management. General classroom management strategies include such practices as establishing a routine and outlining the rules that will govern how the class is run. For the physical education context, Siedentop and Tannehill (2000) included tasks such as entering the gym, taking roll, transitioning, organizing for instruction, regrouping, getting equipment out and away, staying on task, obeying rules for behavior and class closure as examples of frequently recurring managerial tasks in physical education. Safety is an issue that Grossman (1990) has not addressed in her framework, most likely because it is not generally a concern for the classroom teacher as it is for the physical education teacher. Since physical education pedagogues (Rink, 1998; Siedentop & Tannehill, 2000) discuss safety in terms of setting and enforcing rules or designing learning experiences, safety is also included in the management category. An effective management system must be in place before effective instruction is possible (Rink, 1996; Siedentop & Tannehill, 2000).

**General Pedagogical Knowledge: Curriculum and Instruction**

The curriculum and instruction component includes general principles of teaching and learning such as academic learning time, wait time, and group work. For physical education to be considered successful, that is, where the majority of students achieve a
majority of the curriculum goals, Siedentop and Tannehill (2000) stated that both curriculum and instruction must merge appropriately. Curriculum is “a set of objectives and outcomes that describes what students are to achieve in a particular subject matter and the activities planned to achieve those outcomes” (Siedentop & Tannehill, 2000, p. 130). Instruction relates to various teacher moves or behaviors that teachers engage in, in an effort to implement the curriculum and achieve curricular outcomes on a daily basis. According to Rink (1996) “instruction is a process involving pre-active, active, and post-active decision making” (p. 228). Pre-active decisions involve planning units and lessons of instruction. When planning, the teacher is translating the curriculum into appropriate yearly plans, unit plans, and daily lesson plans. Thus planning becomes part of the curriculum and instruction knowledge category.

Rink (1996) summarized the effective teaching research in physical education and outlined a number of principles of practice that underlie effective instruction. At the heart of effective instruction is a situation where students are engaged with the content, at an appropriate level of difficulty (not too hard, not too easy), for a time period that will produce learning. In physical education, this construct is known as Academic Learning Time in Physical Education or ALT-PE for short. According to Rink, (1996) “the ability of the teacher to increase the quantity and quality of practice is the ultimate teaching skill” (p. 178).

Other effective instructional strategies include creating a positive learning climate, which means the classroom climate is “task oriented, businesslike, and slightly warm in their affective tone” (Rink, 1996, p. 179). Effective instruction also includes holding students accountable for their work. Effective teaching in physical education
involves the teacher being able to communicate with learners through the use of demonstrations, explanations, and learning cues. Being able to select appropriate content and understand the ways content can be broken down into simplified segments, for example by examining the various phases of a movement (the preparation, the execution, and the follow through) and understanding the possibilities for simplifying a task or making it more complex for example by increasing or decreasing the size of the equipment, play space, or people involved, and presenting it in a coherent and logical manner, are generic instructional skills in physical education. The ability to provide feedback is also an instructional strategy used to promote student learning. What has been presented here as effective teaching or instructional strategies in physical education are generic. The teacher will have to adapt them for the content they are teaching, to meet the needs of the students they are teaching, and the context in which they are teaching. When the teacher applies these general instructional strategies to specific content, the knowledge becomes pedagogical content knowledge.

When presenting content to students, the teacher has a number of different options or methods they can employ. These options are instructional styles and are included as part of this category. Mosston and Ashworth (1994) present what they have termed the ‘Spectrum of Teaching Styles’ and as the title implies, their book outlines a number of different teaching styles. They indicate that the term teaching style is used to denote specific actions undertaken by the teacher to produce a desired response and state the term is used independent of a teacher’s personal idiosyncrasies. Teaching styles include those that foster the reproduction of knowledge and include the command, practice, reciprocal, self-check and inclusion style of teaching. Also presented are a number of
teaching styles that promote the production of knowledge and include the guided
discovery, convergent discovery, divergent production, the individual program, the
learner-initiated, and the self-teaching style. Although a teacher may have a preference
for a particular teaching style, it is important that the teacher be aware of alternative
teaching styles as some styles are more suited to teaching particular content than others.
For example, rowing in which the objective is to reproduce an effective and efficient
stroke is probably best taught using the command or practice style whereas the discovery
of movement concepts and the creation of a dance are better suited to one of the styles
that promote the production of knowledge.

General Pedagogical Knowledge: ‘Other’ – Aims and Purposes of Education

The ‘other’ component includes “knowledge and beliefs about the aims and
information on this component other than to state that this component includes the
teacher’s general educational philosophy. Noll (1999) put forth a number of
fundamental educational questions, some of which include, “What is an “educated”
person? What should be the primary purpose of organized education? Who should
control the decisions influencing the educational process? Should schooling be
compulsory?” (p. xv). Examples of general educational beliefs or philosophies may
include one’s ideas regarding the place of the schools in fostering the social development
of students, one’s beliefs in the emphasis that should be placed on a liberal arts program
aimed at developing students’ intellectual powers, one’s belief with regards to the place
or role of a national curriculum, or one’s views of the role governments should play in
education.
The concept of pedagogical content knowledge was first introduced by Shulman (1986, 1987). According to Shulman (1986) as a type of knowledge, pedagogical content knowledge “goes beyond knowledge of subject matter per se to the dimension of subject matter knowledge for teaching” and includes “the most regularly taught topics in one’s subject area, the most useful forms of representation of those ideas, the most powerful analogies, illustrations, examples, explanations, and demonstrations – in a word, the ways of representing and formulating the subject that make it comprehensible to others” (p. 9). For this study, in order to be classified as pedagogical content knowledge rather than general pedagogical knowledge, the information or knowledge must relate directly to the teaching of the content under study.

In Grossman’s (1990) model, the pedagogical content knowledge area includes four components. These are, conceptions of the purposes for teaching subject matter, knowledge of student understanding, curricular knowledge, and knowledge of instructional strategies and representations. Each will be described below.

*Pedagogical Content Knowledge: Conceptions of the Purposes for Teaching Subject Matter*

The first component includes the conceptions of the purposes for teaching subject matter. Grossman (1991) elaborated by stating this component includes “what is most important for students to know, understand, and appreciate about specific content, and their understanding of the interrelationship of topics within a subject” (p. 209). As Grossman (1990) explained, “while a conception of teaching a specific subject may overlap with a teacher’s more general educational philosophy, [i.e., the ‘other’
component from the general pedagogical knowledge area from above] it differs in its focus on the goals for teaching specific subject matter to students of a particular age” (p. 86). Furthermore, a teacher’s conceptions of the purposes for teaching subject matter “act as a template for teachers’ decision making about what to teach, what text to use, and what to emphasize within a course” (Grossman, 1991, p. 210). It has also been noted that it is difficult to separate a teacher’s beliefs from their knowledge (Brophy, 1991; Leinhardt, 1990).

Much work has been completed in physical education over the past several years that has provided direction to the aims and purposes of physical education. Broadly speaking, one of the major aims or purposes of physical education is to produce a physically educated person. The National Association for Sport and Physical Education (NASPE) has detailed the outcomes or attributes of a physically educated person. The outcomes describe what a person should know and be able to do as a result of participating in a physical education program. According to NASPE, a physically educated person, has learned the skills necessary to perform a variety of physical activities, is physically fit, does participate regularly in physical activity, knows the implications of and the benefits from involvement in physical activities, values physical activity and it’s contribution to a healthy lifestyle (1995).

In reference to beliefs about the purposes of physical education in particular, Ennis (1996) stated that every time a teacher decides what content to teach they are making a statement about what knowledge is of most worth, and their “answers reflect the teacher’s beliefs about physical education content (curriculum)…” p. 128. In 1995, Placek, Dodds, Doolittle, Portman, Ratliffe, and Pinkham, asked physical education
recruits from across the United States what they felt should be the most important purpose of elementary, middle/junior high, and high school physical education. Using the categories from the Physical Education Outcomes Project and inductive categories derived from a sample of 476 physical education recruits’ responses, the researchers created 9 different categories that described the purposes of physical education. These categories include: (a) “learn skills and activities” and refers to students’ developing and or improving their ability to perform physical activities and motor skills; (b) “name of activity/sport or basic skill” which differs from (a) in that there is no mention that students would improve skill, rather the respondents simply stated a specific activity or group of skills for example, basketball or basic skills; (c) “physical fitness activity/knowledge” which refers to those activities that relate to developing fitness including knowledge; (d) “social interaction/personal development”, which refers to helping students get along with others and develop interpersonal skills; (e) “participation” which involves taking part in activity; (f) fun/enjoyment which refers to enjoying physical education; (g) “cognitive knowledge” which excludes fitness knowledge but includes knowledge related to physical education like learning the rules, strategies, and learning about the body; (h) “valuing physical activity” which refers to developing positive attitudes towards physical activity; and (i) “break/recreation” which refers to physical education class providing a break from other classes but is not a purposefully organized class. The purpose of physical education most frequently expressed was for students to learn skills or activities. Other research in physical education has found that teachers do not conceive of subject as grade-level specific but rather they see students as
“beginning, intermediate, or advanced knowers of the subject” (Schemp, Manross, Tan, & Fincher, 1998 p. 348).

Pedagogical Content Knowledge: Knowledge of Student Understanding

The second component of pedagogical content knowledge “includes knowledge of students’ understanding, conceptions, and misconceptions of particular topics in a subject matter” (p. 8). As Grossman (1990) explains, “knowledge of student understanding differs from more general knowledge of learners in its focus on specific content…” (p. 105). Transferring Grossman’s English examples into physical education examples, knowledge of student understanding in physical education would include knowledge and beliefs about students’ prior knowledge and experience with physical education content, knowledge of common difficulties or misconceptions students have in physical education, knowledge of how students learn motor skills (for example Fitt’s and Posner’s (1967) cognitive, associative, and automatic stages of learning motor skills), and how students come to understand and appreciate physical education content. Such knowledge is necessary, as it will enable teachers to provide students with appropriate explanations and representations and assists teachers with “both curricular planning and expectations and evaluations of students” (Grossman, 1990, p. 105). For example, in physical education, early elementary students may not understand certain vocabulary the teacher intends to use during an explanation, (i.e., what word(s) are appropriate to describe oppositional stepping for a grade one). Thus, it becomes important that teachers know what students know and understand at certain grade levels and what they are likely to have trouble with and why. As another example, when teaching throwing to early elementary children, students often have difficulty stepping with opposition and as a
result, step forward with the leg on the same side as the throwing hand. Knowing this information will allow the teacher to develop an appropriate strategy to overcome this initial misunderstanding. In physical education, researchers have found that teachers assume students know little about the activities and content they teach and assume that most students are beginners (Schemp, Manross, Tan, & Fincher, 1998).

Pedagogical Content Knowledge: Curricular Knowledge

Curricular knowledge is the third component of pedagogical content knowledge. According to Grossman, (1990) this component includes, “knowledge of curriculum materials available for teaching particular subject matter, as well as knowledge about both the horizontal and vertical curricula for a subject” (p. 8). Grossman (1990) provided an example of curricular knowledge using English as the subject matter and stated that with reference to curricular knowledge,

English teachers draw upon their knowledge of which books and topics are typically addressed in the ninth grade and how the various strands of a ninth-grade curriculum might be organized. English teachers also draw upon knowledge of what students have studied in the past and what they are likely to study in the future (p. 8).

Transferring Grossman’s (1990) English examples to physical education, curricular knowledge would include knowledge and beliefs concerning the selection and organization of content at different levels of the curriculum. It would also include knowledge and beliefs about what should be taught at various grade levels, knowledge of curriculum materials available for teaching a particular content area and knowledge and beliefs about how courses should be organized (p. 97). This category differs from the curriculum and instruction component in the general pedagogical knowledge area in that here, the focus is on the specifics of teaching particular content. In the general
Pedagogical knowledge area, the concepts and definitions are relatively broad in that they are applicable to a wide variety of content. Examples of curricular materials are books, equipment, and teaching aids. Also, included as part of the horizontal and vertical curricular is knowledge about various skill progressions and knowledge regarding what students have covered or learned in previous years and what they are likely to be presented with in future programs. The physical educator should know what content is generally taught at which grades. For example, in terms of fundamental skills, early elementary children are generally introduced to the various fundamental locomotor, non-locomotor, and manipulative skills in grade one and begin to refine these skills in grade two with an effort made to use the skills in combination in grade three. In this example, a lack of curricular knowledge would be demonstrated when a teacher introduced the game of basketball to grade one or two students as an applied game for a dribbling lesson. A further example of a lack of curricular knowledge would be demonstrated when a teacher taught a throwing lesson to their grade one students and used the same lesson the following year with the same students when they were in grade 2. Curricular knowledge is important for planning appropriate and coherent lessons from year to year. Research in physical education has shown that when teachers are familiar with the subject matter they are able to describe skill progressions easily and in detail and are able to readily suggest a contingency plan for unexpected situations (Schemp et al., 1998).

Pedagogical Content Knowledge: Knowledge of Instructional Strategies and Representations

The final component of pedagogical content knowledge includes “knowledge of instructional strategies and representations for teaching particular topics” (p. 8). These
include the various metaphors, explanations, activities, etc., that teachers use to make the subject matter easier to understand for students. The difference between this component and the generic instructional strategies presented in the ‘curriculum and instruction’ component from the general pedagogical knowledge area discussed previously, is that here, the teacher must be able to adapt the generic strategies to the specific content they are teaching. For example, it was previously stated that skills can be simplified into preparatory movements, movements related to the execution of the skill, and follow through movements. For this knowledge to be considered pedagogical content knowledge, the teacher must know how to break down the specific content they are teaching. That is, what are the preparatory movements for a basketball lay-up or a volleyball underhand pass? Also, the use of learning cues to promote student learning can be considered a general instructional strategy. Using a specific learning cue, for example, when teaching the overhead pass in volleyball, physical educators often use the concept of ‘looking through a window’ when introducing and explaining hand positioning (Doutis, 1997), is considered pedagogical content knowledge as the cue or explanation is specific to the volleyball overhead pass. Examples of effective instructional strategies when teaching volleyball to elementary students include allowing students to serve a volleyball from a close distance, using beach balls or trainer volleyballs as opposed to regulation volleyballs, and lowering the net in order for students to experience success (Doutis, 1997).

Knowledge of Context

Teachers must take the general body of knowledge about teaching they possess and adapt it to the particular settings or context in which they are teaching. Components
included in the knowledge of context area include, knowledge of students, community, district, and school.

**Knowledge of Context: Students**

Knowledge of students refers to the specific characteristics of a particular group of students. Knowledge of students differs from knowledge of learners in that the former focuses on the particular group of students the teacher is working with whereas the latter focuses on general characteristics of learners such as various learning styles and general developmental characteristics. Examples related to knowledge of students include, what is the socioeconomic background of the students, how have the students scored previously on state examinations, what are the characteristics of the family (eg. single parent, double parent) (Grossman, 1990)? Shulman (1997) also suggests the language, culture and motivations as well as gender, age, ability, interests, self-concepts, and attention of students be considered.

**Knowledge of Context: District**

According to Grossman (1990), knowledge about the community includes being aware of community interests and values. Being aware of “the character of communities and cultures” is also included in this category (Shulman, 197, p. 8).

**Knowledge of Context: District**

Knowledge of the district includes awareness of the “opportunity, expectations and constraints, posed by the district” (Grossman, 1990, p. 9), and the governance and financing of school districts (Shulman, 1987).
Knowledge of Context: School

Knowledge of the school involves knowing about any contextual factors that may influence instruction, for example the school culture, and departmental guidelines (Grossman, 1990) and “the workings of the group or classroom” (Shulman, 1987, p. 8). Contextual classroom factors that may impact instruction include the classroom teacher or teachers if team teaching is being exercised, the involvement of a cooperating teacher if a student intern is present, if an intern is present then the number of interns working together, and all other personnel who may be present in the classroom, for example teaching aids.

The lines between the four components of pedagogical content knowledge described above are not as clear in practice as they are in theory. However, the model does provide a useful tool for investigating teacher knowledge (Grossman, 1990). Since it is pedagogical content knowledge that distinguishes the subject matter expert from the experienced teacher (Shulman, 1996) it becomes essential to study how this knowledge is acquired.

Grossman (1990) suggests there are four potential sources for a teacher to develop pedagogical content knowledge. The first is through what Lortie (1975) has termed an ‘apprenticeship of observation’. Prospective teachers spend years as students in elementary, secondary, and post secondary classrooms observing various images of teaching such as what to teach and how to teach. Pedagogical content knowledge can also be developed through students’ disciplinary background; the courses, content, and understanding of the content required in their undergraduate programs of study. Professional coursework, for example, methods classes, also contribute to students’
pedagogical content knowledge. Another source from which students can develop their pedagogical content knowledge is actual teaching experience. According to Grossman, (1990), working with students in classrooms provides teachers with an opportunity to apply knowledge gained from other sources and in effect learn about students’ misconceptions, prior knowledge with content, and various metaphors and strategies that are effective when teaching specific topics or content.

Pedagogical Content Knowledge in Physical Education

Several research investigations have been conducted in physical education that specifically addresses the subject of pedagogical content knowledge. The focus of this review is to describe selected research that has been undertaken in an effort to discover more about how physical education teachers come to know their content and how they present this content to maximize student learning.

To begin to understand how pedagogical content knowledge develops in physical education, Rovegno (1991, 1992a, 1992b, 1993, 1994) used interpretive research techniques and undertook a series of research projects. Her initial research (Rovegno, 1991) investigated how seven pre-service teachers restructured their knowledge during a field-based elementary physical education methods course. This was followed by research which explored what knowledge pre-service teachers felt was salient and how this knowledge developed (Rovegno, 1992a), how new knowledge was acquired (Rovegno, 1992b) and applied (Rovegno, 1993), and how content knowledge emerged and persisted in context (Rovegno, 1994). Through the use of a case study, Rovegno (1995) examined the task, content and progressions made by a student teacher and how his pedagogical content knowledge contributed to his explanations regarding decisions he
had made. The preceding studies all focused on learning to teach during pre-service teacher preparation programs. To examine knowledge acquisition in a naturalistic setting, Rovegno (1998) investigated aspects of learning a constructivist movement approach that were salient and initially problematic for 1 experienced teacher, 2 early career teachers, and 1 student teacher. This line of research will be discussed in more depth.

Rovegno, (1991) used a cognitive perspective as a starting point to investigate the knowledge development of seven pre-service teachers enrolled in a field based elementary physical education methods course, that focused on movement education content. A cognitive perspective holds that meaning is found by actively searching for new knowledge and revising prior knowledge based on new information and experiences. Knowledge restructuring is one of three qualitative ways knowledge is said to develop. Restructuring occurs when individuals use old or existing knowledge structures to refine and/or build new knowledge structures. In order to describe how pre-service students restructured their knowledge throughout the course, Rovegno (1991) collected data by observing and taking field notes on all class sessions and all interviews between students and their teacher, conducting three formal and several informal interviews with all seven participants, and collecting all class handouts and all work completed by students throughout the semester. Results indicated that the pre-service teachers found two areas of their prior knowledge to be problematic and interfered with their teaching. Initially, the students’ teaching could be described as simply “going through the motions” (p. 208) of teaching; that is, presenting a series of tasks. However, after feeling more comfortable teaching, and after they felt they knew their content better and knew what responses they
were looking for from their students, that is, they developed more pedagogical content knowledge, they reported a positive change in their teaching. Secondly, after being provided multiple suggestions for children’s responses by the teacher educator, the pre-service students restructured their knowledge from thinking students were intentionally misbehaving and uninterested in learning to realizing that they were actually eager to learn. Throughout the semester the students identified the above two areas of their knowledge to be problematic for their present teaching situation and sought new information and meaning as a way to restructure their old, inadequate information into new, more meaningful ways of knowing that were more useful for their roles as teachers trying to promote student learning.

To begin to understand how pedagogical content knowledge developed, Rovegno (1992a) conducted a study to describe what knowledge pre-service teachers felt was salient and how this knowledge developed. Using seven pre-service teachers who were enrolled in a semester long, field based, elementary methods course, the researcher acted as a participant observer in all class sessions and field observations, and conducted three formal interviews with each subject at equal intervals throughout the semester. Also, all work completed in the course was collected and used as data. Findings revealed that the pre-service students felt the development of pedagogical content knowledge was a salient factor in learning to teach. The development of this knowledge fell into two categories. In one category, the development of pedagogical content knowledge was explained as the result of an increased differentiation in terms of individual/task/environment relations. Initially, students did not feel their pedagogical content knowledge was differentiated enough. For example, at the beginning of the semester, students voiced concern that
they did not know what to expect in terms of what elementary students could do, how they would react to various tasks, and how much improvement to expect. However, as the semester progressed, their pedagogical content knowledge became differentiated in two ways. First, the students were able to shift their content focus from a general level to a more specific level. Second, they felt they were better able to understand and develop content progressions. That is, they were better able to plan and observe (the task), teach (the individual), and understand how their students learned (the environment). Together, these two differentiations made the participants feel more confident in their abilities and felt their lessons were much better as a result. In the second category, the development of pedagogical content knowledge was explained as a series of relationships between knowing ‘that’ and knowing ‘how’ – being able to transform content knowledge for teaching. These relationships included an improved ability to observe, developing the ability to react to their observations with appropriate feedback, and transforming what they knew into appropriate actions. Although all participants felt that the development of pedagogical content knowledge was a salient factor in learning to teach, the researcher concluded the study by asking what it means for pre-service teachers to adequately know their participant matter and how the degree of knowledge is related to the individual/task/environment relationship.

As a follow-up, a study to understand how K-8 pre-service physical education teachers acquired knowledge was undertaken (Rovegno, 1992b). In order to determine how new content was acquired, movement education content was selected as the focus for the study as it differed significantly from the traditional sport skills content that was familiar to participants. To gain insight into this question, the researcher attended all
movement classes, observed and videotaped participants during field experiences, collected students’ work from their classes, and conducted formal and informal interviews with all eight participants. Rovegno (1992b) found that students encountered two major problems in learning the movement approach. The first was that they failed to understand the deeper content objectives of the movement approach. They were unable to distinguish the common properties of dance, games, and gymnastics content (for example, how traveling concepts are similar and different when used as content for dance, games, and gymnastics). The second problem encountered in learning the movement approach was that the students confused the aspects of movement variety and movement quality. Four mechanisms were attributed to this confusion. One, students viewed variety and quality as two separate categories that could not be crossed or overlapped. Second, students over relied on a single mid-range concept. They had a tendency to focus on movement variety with little attention being paid to the quality of the movement. Third, students did not recognize the importance of a concept. More specifically, students rarely explored the quality dimension of the movement concept. Lastly, students over-generalized the rule of thumb, which stated, ‘don’t tell children what to do’. Students felt that since it was movement education, any response was acceptable and correcting responses or suggesting alternatives would hinder the children’s creativity and expression. As a result of not understanding the deeper objectives of movement content and relying on variety as opposed to quality, Rovegno (1992b) stated that the lessons “become lessons in which children experience content at the surface level” (p. 262). Despite the fact that all participants were seniors who had been exposed to several methods courses and other field experiences, they still were not
able to “understand many important relations among content and teaching” (p. 262). Appropriate content knowledge is essential if students are expected to apply that knowledge in teaching situations to produce student learning.

To investigate how pre-service teachers learn to apply content knowledge, Rovegno (1993) extended her line of inquiry and investigated those aspects of the movement approach to game play / strategy that pre-service K-8 physical education teacher education majors found confusing or difficult to learn or apply. Eight K-8 senior physical education teacher education students and 4 first year teachers who had graduated from the same program the previous year and were in their second month of full time teaching, acted as participants for the study. As in the previous studies (Rovegno, 1992a, 1992b), movement education content was the focus of the study as it differed from the traditional sports content and models participants were familiar with. Analyzing data gathered after observing methods classes, field experiences, and student teaching placements, collecting documents completed during course work and teaching experiences, and conducting both informal and formal interviews, Rovegno (1993) found that “partial understandings and inaccurate misconceptions of movement approach topics” (p. 60) was part of understanding and learning to apply the new and complex content of movement education. Students understood the movement approach in relation to developing games skills, but initially, “found game play / strategy confusing or difficult to learn and apply adequately?” (p. 67). Some of this confusion was a result of a number of factors. For example, students initially assumed that game play / strategy was not content to be taught but rather that students would eventually ‘pick it up’ by playing games. Furthermore, students over generalized the difference between movement
education and traditional physical education and in turn rejected anything that reminded them or sounded like it was derived from traditional physical education models. The participants associated game play / strategy with the traditional approach and hence rejected it as content to be taught in a movement education program. Also, students had problems applying their knowledge as a result of over relying on bottom up thinking. That is, they planned their lessons by first considering the skill for the lesson and then selecting a game that was related to that skill. To better included game play / strategy as content to be included in lessons, students would have had to utilize both bottom up and top down thinking whereby top down thinking would have meant considering the host of games or game like situations that would be required for the unit and with these, all the skills and strategies necessary to succeed with these games. Perhaps if game play / strategy content was focused on to the extend that skill development was emphasized during teacher training, maybe pre-service teachers would come to appreciate and accept game play / strategy content as important content to teach during movement education units. On a positive note, the researcher discovered that when she went back the following year to conduct source checks, some students were beginning to realize that game play / strategy was actual content that should be taught. This is probably the result of both experience and a delayed effect of understanding information presented during pre-service training (Rovegno, 1993).

In a further effort to explore and describe the development of pedagogical content knowledge, Rovegno (1994) continued her research by investigating how content knowledge emerged and persisted in context. Data was gathered on two student teachers by collecting all lesson plans, conducting informal interviews before and after each
lesson and a formal interview at the end of a unit, and observing both participants teach an elementary games unit and a high school sport unit. Results illustrated that various aspects of a school’s culture influenced how the pre-service students came to know their content, suggesting that the development of pedagogical content knowledge was situated within a particular context. Students quickly learned to function within a ‘curricular zone of safety’ that was bounded by significant aspects of the school culture. Aspects of the school culture that influenced these student teachers’ development of pedagogical content knowledge included a lack of support for physical education by administrators, existing teacher and student subcultures, and the existing physical education program. Entering a teaching practicum where the existing physical education program was viewed by administrators as a time to deal with student problems, where teachers suggested not teaching content, where students resisted skill explanations, demonstrations, and drills and expected to play games the majority of the time, prevented the student teachers from teaching content the way they wanted. Instead, both participants retreated to a “curricular zone of safety that help[ed] account for the emergence and persistence of particular ways of knowing content” (Rovegno, 1994, p.278). The participants acted according to the ways they perceived they could best function in their particular situations.

Since the curricular zone of safety is dependent upon school contextual factors, each teaching setting differs in the manner in which it affords student teachers an opportunity to develop pedagogical content knowledge. For example, the zone of safety at the elementary level was much wider, thereby allowing both students an opportunity to apply their content knowledge by exploring different ways of planning and presenting content in a safe environment. However, at the high school level, exploration of content
delivery was limited in that the safety zone was very narrow and venturing outside the zone, spelled disaster. Being unable to explore various ways to deliver content “constrained the emergence of further pedagogical content knowledge” (Rovegno, 1994, p.279).

When contextual factors allow for the exploration of various ways to deliver content, how do teachers sequence their content, and on what basis are these decisions made? Rovegno (1995b) set out to explore answers to this question. Using a case study design, she examined the task content and progressions made by a student teacher and how his pedagogical content knowledge contributed to his explanations regarding decisions he had made. A 3rd and 4th grade nine-lesson volleyball unit and an 11th and 12th grade 5-week (2–3 lessons per week) badminton unit were observed daily and thoroughly described. Lesson plans and handouts were collected and informal interviews occurred each day. One formal interview was conducted at the end of the participant’s student teaching. Data analysis revealed that the student teacher divided content into skills and games. Skill content reflected a molecular approach in that the student teacher introduced each skill individually whereas games content reflected a more holistic approach. Skill presentation focused on telling and showing students how to execute the skill using proper form and having them try it. Task progressions went from informing tasks to application tasks without any extension and little, if any, refining tasks. The number of practice trials was limited as the student teacher had all students stand in one line and tossed the ball to each one. Games content focused on following the rules and routines of volleyball and aiming for good rallies, so that students would enjoy the game more. One large class game was played daily. The pedagogical content knowledge used
to explain why various content decisions were made, was based on the participants’
knowledge and belief about how students learn. Decisions about skill content were based
on the belief that learning skills was accomplished when students received individual
attention. Therefore, dividing students up and having them practice in groups or partners
would limit the individual attention each student received from the teacher. The teacher
believed that decreasing the number of practice trials in order to provide positive
reinforcement was inevitable. Presenting only the closed version of an open skill was
based on his knowledge and belief that students would eventually figure out how to
adjust the skill by themselves. Decisions about games content were based on the
participant’s belief that competition motivated students to learn. Modifications to the
game were made so that students could experience successful rallies. The games were
kept simple and were never interrupted because it was felt that the students would lose
confidence and it would decrease their enjoyment. One large game was played as
opposed to two smaller games because the teacher wanted to provide positive
reinforcement after every hit. Like the decision made for skill content, the teacher felt
that limiting the practice opportunities in order to provide individual reinforcement was
inevitable. Rovegno (1995) argued that, “a teacher’s conception of knowledge and
learning are factors that can contribute to explanations for that teacher’s actions
regardless of whether these conceptions are in keeping with the scholarly literature and
research” (p. 298).

The research described above had been conducted with pre-service teachers
learning to teach in methods courses or field based settings. In an effort to describe how
knowledge acquisition occurred in a more naturalistic setting, Rovegno (1998) worked
with one experienced, two early career, and one student teacher to explore salient and problematic aspects of learning to teach a constructivist movement approach. The participants identified three aspects of learning to teach a constructivist movement approach as initially problematic and also identified the factors that facilitated their knowledge development. The first problematic aspect was knowing when to give information and tell children what to do. Initially, participants felt they should not tell students what to do or intervene when problem solving. The experienced teacher learned through experience, and the three other teachers learned from the experienced teacher, that in order to facilitate learning, it was sometimes necessary to intervene and provide guidance. Secondly, when beginning to use a movement approach, participants were unable to see the ‘big picture’ with respect to the content taught when using a movement approach. For example, they did not understand the connections between the movement concepts in general and how the concepts related to games, dance, and educational gymnastics. Factors that influenced their knowledge development relative to being able to see the big picture, included experience teaching elementary children and guidance from the experienced teacher. Through discussions with each other and reflecting on the daily experiences of teaching children, participants were eventually able to link movement concepts to games, dance, and gymnastics. The discussions and reflections also helped participants plan and deliver better progressions in their lessons. These two ideas, linking general concepts to various movement forms and including progressions, helped the participants see the big picture. The third aspects participants found problematic was not knowing less structured content in enough depth and detail to be able to facilitate student learning. For example, not having detailed enough pedagogical
content knowledge, the participants described problems with knowing what to say, what
to look for, how to develop content in a such a manner as to promote movement quality
and variety, how to help students refine movements, and how to critique student
movement sequences. Factors that facilitated knowledge development of this initially
problematic aspect of learning to teach a constructivist movement approach again
included discussions with each other and observations of children’s movements. Also,
the participants attended workshops and read the literature for information that would
provide them with the depth of knowledge they felt they needed. Summarizing the above
line of research, it appears that knowledge of content and the development of pedagogical
content knowledge are salient aspects for in-service teachers exploring and continuing to
learn on the job (Rovegno, 1998) and for pre-service teachers as they progress through
teacher education programs and learn to teach. Lack of both knowledge and pedagogical
content knowledge limited both the pre-service and in-service teachers’ ability to deliver
appropriately. Furthermore, the ability to develop pedagogical content knowledge may
be enhanced or restricted by contextual factors (Rovegno, 1994) or personal beliefs and
knowledge about how children learn (Rovegno, 1995). Once an adequate knowledge of
content is acquired, it is essential that the pre-service teacher be able to apply their
content knowledge in an environment where risks can be taken – where pre-service
teachers can plan and present material in various ways, eventually becoming more
comfortable with the content, with pedagogical procedures, with students, and with the
amalgamation of all three. If such an environment is not available, the development of
pedagogical content knowledge may be hindered and students may resort to particular
ways of knowing (Rovegno, 1994) and hence, miss the opportunity to restructure existing knowledge into more meaningful ways of knowing (Rovegno, 1991, 1998).

Rovegno’s research has shown that adequate content knowledge is essential for effective teaching. It is assumed that as pre-service teachers progress through their coursework and field experiences they will increasingly gain more content knowledge. However, as suggested by Shulman (1996), knowing content is not enough. Teachers must be able to transform, combine, and transmit content in ways that are meaningful for the learner. Rovegno (1993) demonstrated that initially, pre-service teachers had trouble applying their knowledge in ways that were meaningful. However, a year later, she found that the same students had gained a deeper understanding of the content and how to better apply it, suggesting that the development of pedagogical content knowledge developed over time. The development of knowledge over time was investigated by Ennis, Mueller, & Zhu (1991).

Like Rovegno (1991, 1992a, 1992b, 1993, & 1994), Ennis et. al., (1991) used movement content to examine and compare the acquisition of knowledge structures of undergraduate physical education majors in various stages of their training with that of experienced and expert teachers (first semester = novice group; six credits of elementary methods coursework = coursework group; students who had completed student teaching = student teaching group; and teachers with a minimum of 10 years teaching experience = expert group). Rather than using ethnographic techniques as had been used previously (Rovegno, 1991), Ennis et. al., (1991) used a cognitive mapping procedure to describe the development of participants’ knowledge. Analysis of these data revealed that in most knowledge structure categories, the complexity and coherence of the participants’
knowledge structures increased linearly across groups from the novice group, to the coursework group, to the student teachers, to the experts. That is, as the participants took more courses and gained more experience, they were better able to understand the components of the movement framework, suggesting that content knowledge “developed in complexity from novice to expert” (Ennis et. al., 1991, p.315.) Whereas Rovegno’s (1991) study focused on only one category of knowledge development, namely restructuring, Ennis et. al., (1991) used all three knowledge categories described by Rummelhart and Norman (1978, as described in Ennis, et. al.), more specifically accretion, tuning, and restructuring to describe the development of knowledge across groups.

It appeared that the novice and coursework groups demonstrated characteristics congruent to the accretion category of knowledge development. Here, participants attempted to add or fit new knowledge into their existing knowledge structures or what they already knew. For example, students’ existing knowledge structure consisted mainly of a sport orientation and thus they tried to add movement content and fit the new concepts into their existing knowledge and experience. Some students in the coursework group were already in, or were entering, the tuning category. These students were beginning to alter the previous categories they had initially used to acquire new information into categories that could be used to interpret new information. This was evidenced by more coherent and complex knowledge structures than their peers in the same group. For example, these participants were beginning to understand major movement concepts but they were limited to various terms such as locomotion. Student teachers were found to have more clearly defined content categories than did the
coursework participants. They displayed more characteristics of the tuning category, some displaying characteristics of the restructuring category. This was seen in the increased frequency and coherence of concepts used in their cognitive maps. Participants in the expert group demonstrated a significant increase in the frequency and coherence of knowledge structures than those displayed by the three other groups. Experts were better able to connect, interpret and accommodate movement concepts into existing knowledge structures and knowledge of learners and context to produce the most detailed concept map of all four groups.

Housner, Gomez, and Griffey (1993a) investigated the how the pedagogical knowledge of an experienced teacher educator influenced and changed the pedagogical knowledge structures of undergraduate education majors enrolled in a generic physical education teaching methods course. The Pathfinder network scaling algorithm was used to map and compare the knowledge structures of the teacher educator and undergraduate education students. The course instructor identified 36 key pedagogical concepts that represented the most important pedagogical knowledge contained in the course and rated the relatedness of all possible pairs of concepts. Students then rated all possible pairs of the 36 previously identified key pedagogical concepts once at the beginning of the course and at the completion of the course. A Pathfinder software package then compared the students’ pedagogical knowledge structures to that of the teacher educator. As the course progressed, the students demonstrated an increased ability to organize and differentiate various pedagogical concepts - they were able to make significantly more links among pedagogical knowledge concepts that more closely resembled those of the teacher educator. However, a number of important links between concepts were still missing.
Similar to the findings on the development of content knowledge (Rovegno, 1991, Ennis, et. al., 1991), it was suggested that students may have been “experiencing knowledge structure change through a slow and deliberate process of accretion or restructuring relative to previously held beliefs about effective teaching” (Housner, et. al., 1993a, p. 175). A follow-up conducted six months later found that students were just beginning to assimilate pedagogical knowledge. Overall, the results provided evidence that students internalized, retained, and used the key pedagogical concepts that comprised a major focus of the course” (Housner, et. al., 1993a, p. 175) and retained a large percentage of the pedagogical knowledge previously learned.

Another finding from the Housner et. al. (1993a) study was that the students who achieved higher grades in the course organized their knowledge in a manner that was more similar to the course instructor’s. If one of the purposes of studying the development of knowledge in teaching is to be able to present such material to pre-service teachers in more effective ways, (Ennis et. al., 1991, Housner et. al., 1993a) then it is important that the body of knowledge used in the study of teaching possess external validity, that is, it is generalizable. With the Housner et. al., (1993a) study it was not known whether the teacher educator’s pedagogical knowledge was generalizable or whether or not he was committed to a particular instructional model. If the teacher educator’s knowledge structure lacked validity, its applicability to improve teacher education would be limited. Thus a follow up study was conducted (Housner, Gomez, & Griffey, 1993b) to determine the external validity of the pedagogical knowledge investigated in the previous study (Housner, et. al., 1993a). Five different teacher educators were recruited from five different teacher education institutions to rate all
possible pairs of the 36 key pedagogical concepts identified in the original study. The same pre-service student teacher data used in the Housner et. al., (1993) study was used to compare the students’ beginning and end of the year pedagogical knowledge structures to that of both the initial course instructor and the five experienced teacher educators. Results indicated that the teacher educators were consistent in their ratings of the concept pairs and that the ratings amongst the experienced teacher educators were similar to that of the course instructor. Students’ pedagogical knowledge structures more closely resembled that of the experienced teacher educators and the course instructors as the course progressed. The authors stated that “the findings indicate that the domain of pedagogical knowledge was well known to all teacher educators and comprehensible to prospective teachers” (Housner et. a., 1993b, p. 297), thus providing evidence that the body of pedagogical knowledge under study possessed external validity.

The Housner et. al., studies (1993a, 1993b) demonstrated that the pedagogical knowledge of a teacher educator could influence the general pedagogical knowledge of general education students enrolled in a generic physical education teaching methods course. But, what about the impact or effectiveness of teacher education programs as a whole? This question formed the basis of a study by Graber (1995).

Specifically, Graber (1995) examined how pre-service teachers believed they incorporated general pedagogical knowledge and pedagogical content knowledge into their lessons, and which elements of their teacher education program they believed most guided their practice. Formal interviews were conducted with 20 physical education student teachers from two separate universities (10 from each university), 8 teacher educators from the same two universities (4 from each university) and 7 cooperating
teachers (3 from one university and 4 from the other). All course work and field experience documents were also collected and analyzed. Data analysis revealed that students from both universities believed they had adequate pedagogical knowledge to organize and manage a class effectively, were either apprehensive or very concerned with discipline especially at the secondary level, and felt that they were prepared to motivate elementary students but not secondary students. Student teachers from Mountain University felt especially unprepared to motivate and teach secondary students. All student teachers felt they possessed the pedagogical knowledge to deliver clear instructions. Student teachers recognized the importance of providing feedback as a pedagogical skill and had no problem delivering positive feedback. They also recognized the importance of specific feedback but felt they lacked the ability to analyze skills well enough to provide specific feedback. Teacher educators reported that providing feedback had been part of the students’ coursework but doubted that students could incorporate it automatically and effectively into their teaching. The extent to which student teachers felt they could incorporate pedagogical knowledge was based on contextual factors like the school, the level, the cooperating teacher, and the students. Overall, students appeared to understand and felt they were able to incorporate general pedagogical skills into their teaching. Unfortunately, the same was not found for their ability to incorporate pedagogical content knowledge into their lessons. According to Graber (1995), most students understood the importance of combining pedagogical knowledge with content knowledge but “indicated that they had no specific training for determining what pedagogical strategies were best suited for particular types of physical education subject matter” (p. 169), and often resorted to trial and error techniques. Regarding the selection
of activities, some student teachers felt that activities should be selected only after initial skill levels were assessed. Others selected activities and teaching strategies based on how they remembered being taught the skill or based on how they observed a cooperating teacher teach the activity. Incorporating pedagogical content knowledge into their classes proved most difficult when student teachers lacked content knowledge and attempted to overcome this lack of knowledge by putting extra time and effort into planning. In response to student voiced concerns regarding the lack of pedagogical content knowledge provided during training, a number of teacher educators felt that the topic was adequately covered through coursework whereas one said it was never addressed. Students identified their teaching practicum as the most influential part of their teacher preparation program. Students from Mountain University felt that their practicum experience could have been even more influential if they had been provided opportunities to work in the schools sooner and if they had been better prepared for the realities of secondary schools. Teacher educators agreed that more hands-on experience would have strengthened their existing programs. Cooperating teachers were most critical of the lack of experience student teachers have before interning. Physical education methodology courses were identified as the most valuable courses for developing knowledge for teaching. Activity courses, when taught effectively, were cited by some students as being valuable whereas others felt their activity courses were geared too much toward the secondary level.

The majority of the studies previously discussed have focused on the knowledge development and/or the pedagogical knowledge development of preservice physical education students. The following two studies examined the knowledge development
(Walkwitz & Lee, 1992) and pedagogical knowledge development (Barrett & Collie, 1996) of experienced teachers learning to teach unfamiliar content.

Walkwitz and Lee (1992) designed a study to describe how veteran teachers (minimum 5 years teaching experience) transformed and used content knowledge during instruction. Eight kindergarten classroom teachers who possessed high levels of generic teaching skills competence and little throwing experience (verified through systematic observation), served as participants for the study. The teachers were asked to design a 6 week/18 lesson unit which focused on maximum development of the overhand throw. Prior to teaching the unit, teachers were divided into two groups: a practice time training group and a knowledge-training group. The practice time group received information and strategies on how to maximize student-learning time, and were provided a manual that outlined a number of throwing games. The group received no information, which described how to throw. The knowledge group received detailed information about the overhand throw, viewed a video on the various developmental levels of throwing and were encouraged to reflect on how throwing would be effected by the developmental level of their kindergarten students. The knowledge group also received a condensed version of the material presented to the practice group. An observational knowledge task was administered before and after the throwing unit to ensure that the participants in the knowledge-training group were more knowledgeable than those in the practice group and to ensure that they retained their knowledge at the end of the unit. The test was observational, because by definition pedagogical content knowledge is characterized by the ability to apply knowledge to teaching. The observational task had the teachers view immature throwing patterns and comment on what they saw and what they would say to a
student in response to the actions observed. A stimulated recall interview was conducted every two weeks. Here, the teacher would view a segment of a previously taped class and answer a series of questions, which were later analyzed for items of information related to throwing technique. Also, to determine whether the instruction provided by the knowledge trained teachers resulted in higher quality practice, the frequency of opposite foot stepping was tallied. Results from the stimulated recall indicated that the knowledge trained teachers relied heavily on the concepts they had learned during training to provide answers to the various questions that were asked. Knowledge trained teachers provided 385 items of information related to various concepts of throwing technique compared to 17 information items provided by the practice trained teachers. The knowledge-trained teachers’ comments focused heavily on technique whereas the practice teachers comments focused more on students’ throwing accuracy. Regarding the quality of throwing practice, the students in the knowledge trained teachers classes received significantly more opposite foot throwing practice opportunities than did the practice teachers’ classes, “suggesting that the experimental teachers were better able to structure the learning activities so that their pupils practiced higher quality throws” (Walkwitz & Lee, 1992, p. 184). The knowledge trained teachers were able to integrate the new knowledge they gained during training with what they knew about effective teaching to observe, interpret, and provide feedback to students that resulted in more and higher quality throws.

Barrett and Collie (1996) pointed out that much of the research on pedagogical content knowledge to date has focused on teachers teaching, interviews about teaching with teachers, and or the collection and examination of teachers’ documents.
Approaching the study of pedagogical content knowledge from a different perspective, Barrett and Collie (1996) gathered and analyzed data by observing changes in the learner’s movement patterns as they progressed through a series of lacrosse lessons being taught by teachers who were learning to teach lacrosse. After attending an eight hour workshop which focused on an overview of a modified version of lacrosse, information and practice on the skills that would eventually be taught to students, and information on how to teach the skills to students, eight of the 12 workshop participants agreed to videotape their classes and participate in the study. Only four of the eight teachers’ videotapes were useable for data analysis. For data analysis, the researchers viewed the tapes together, and described and discussed out loud the progressions and/or regressions of the children’s movement patterns. Three conceptual frameworks guided the observations and discussions: a) Roberton and Halverson’s (1984) component approach to developmental sequences, b) Halverson’s (1966) concept of eliciting the desired movement pattern, and c) Newell’s (1986) constraints theory. The results were limited to the cradle only and were reported as observed links between the children’s movement patterns and their teachers’ actions. In short, the learner’s movement patterns progressed or regressed depending upon the task presented by the teacher. The findings identified a series of skills and concepts that teachers must employ effectively if children are to improve their cradling skills. These skills and concepts included: a) the natural opposition of arms and legs that occurs when children run, b) the effect of running speed on one’s range of movement, c) the critical role played by the position of the stick, the top-hand grip, hand placement, and available space. Thus the children’s developmental levels of the cradle were dependent upon the relationships that occurred between the
organism, which was the child, the environment, which included the space the activity
took place in, and the task. It was the teacher’s responsibility to observe these
relationships and analyze their effect on the children’s performance and alter the task or
environment as necessary to promote learning.

The majority of studies conducted have examined the development of knowledge,
pedagogical knowledge, and or pedagogical content knowledge of pre-service teachers.
In contrast to a lot of research described above, Schempp (1995) examined the criteria an
experienced high school physical education teacher used to acquire the knowledge
required to teach. Data was gathered over a four-month period through participant
observations, artifact and document analyses, stimulated recall via videotapes, and formal
and informal interviews. Shulman’s (1987) theory of a knowledge base for teaching
influenced four of the five categories or forms of knowledge that emerged from the data.
The four forms of knowledge the participant acquired that enabled him to teach were:
subject matter, general pedagogical knowledge (renamed teaching behavior), pedagogical
content knowledge, and context (renamed external conditions). A fifth category outside
of Shulman’s original seven, named classroom organization, also emerged as a necessary
form of knowledge for teaching.

The knowledge this subject acquired and deemed necessary to teach was based on
the daily demands of teaching. The participant felt that being able to organize and
operate a class were essential ingredients to effective teaching, for without control and
organization, little else could be accomplished. Personal experience and beliefs as
opposed to outside resources were relied upon for such knowledge development. The
participant had developed very routine teaching behaviors, following a very traditional
class structure. Admitting that he lacked teaching strategies, the participant did not actively seek to improve his existing strategies. He measured success via student enjoyment, thus student learning was not a major concern or priority. Sensing that the administration and parents were not concerned about student learning in physical education only reinforced the participants’ existing beliefs and practices. Subject matter included units that came mainly from undergraduate projects required during teacher preparation courses taken 15 years earlier. New subject matter was acquired if the participant felt he was competent to teach it, if he was personally interested in it, if students demanded it, if the amount of preparation time required to prepare or teach the new content was limited, if the subject was novel, and if there were no facility and equipment constraints. Subject matter for teaching or pedagogical content knowledge was acquired and used only if it could be incorporated into his existing teaching style. Not being an expert in the content he taught, a breadth of content was taught as opposed to depth. New content was selected and incorporated into his program if it fit into the existing class routines and if the lessons could be adapted to simulate content that was more familiar to him. External conditions or conditions not under the participant’s immediate control played a minor role in his knowledge acquisition. State and local regulations that ran counter to existing beliefs were passively resisted or if required (for example, a new curriculum), only token modifications would be made.

To date, the reviewed research has demonstrated that the development of knowledge, pedagogical knowledge, and pedagogical content knowledge is a complex process that often takes time and experience. For example knowledge development and pedagogical knowledge development were shown to develop as the result of restructuring
inadequate information into new, more meaningful ways of knowing (Rovegno, 1991, Housner, et. al., 1993a). It often takes several courses and field experiences before this process begins to take effect (Rovegno, 1992b, 1993, Ennis et. al., 1991). The development of pedagogical content knowledge involved understanding the complex relationships that exist between the task, the individual and the environment (Rovegno, 1992a,), the context of the teaching situation (Rovegno, 1994) and the teachers’ conceptions about how students learn and their personal beliefs (Rovegno, 1995). Other studies have demonstrated that when teachers are specifically trained to teach specific content, as opposed to being provided with content knowledge and pedagogical knowledge and being expected to amalgamate the two by themselves, they are better able to structure the environment to produce learning (Barrett & Collie, 1996, Walkwitz & Lee, 1992).
CHAPTER 3

METHODS OF INQUIRY

The purpose of this investigation was to examine and describe the types, sources, and perceived relevance of knowledge, and the enacted effects of this knowledge, that student teachers acquired during a secondary teaching internship when they were teaching content they perceived to be either familiar or unfamiliar. Grounded in a qualitative approach, an interpretive framework and case study methodology guided this study. Data were collected through both formal and informal interviews with cooperating teachers and student teachers, examination of student teachers’ lesson plans, observation of student teachers while teaching lessons, and stimulated recall via videotape. This chapter will outline the methodological approaches adopted for the investigation, describe the participants and their teaching units, describe procedures used to gain site access, outline data collection and analysis strategies, and address issues of trustworthiness of data.

Methodological Approaches

A grounded theory approach was used through this study. More specifically, the researcher used an existing model of teacher knowledge. This was Grossman’s (1990) model, based on work conducted in English. Grossman’s model was used and modified for the parts of research questions 1 and 3 that dealt with the types of knowledge
acquired. Furthermore, an interpretive framework and case study design guided this study. A case study is defined as “a detailed examination of one setting, or a single subject, a single depository or document, or one particular event” (Bogdan & Biklen, 1998, p. 54). Case studies are often able to provide a large amount of information from a limited number of exemplars (Patton, 1990). An interpretive perspective has as its goal, “to [understand] the complex world of lived experience from the point of view of those who live it” (Schwandt, 1994, p. 118). Working from this form of human inquiry, the researcher assumes a set of theoretical commitments and philosophical assumptions about the nature of the world and how one can know that world. Interpretists adopt a relativist ontology, believing that there is no one truth or reality, but that multiple realities exist; a subjectivist epistemology, believing that understanding is created between participant and researcher; and a naturalistic set of methodological procedures, preferring to collect data in the natural world (Denzin & Lincoln, 1994).

Various perspectives, strategies or ‘traditions’ such as human ethology, ecological psychology, holistic ethnography, cognitive anthropology, ethnography of communication, and symbolic interactionism (Jacobs, 1987, 1988) exist within the interpretive paradigm. The appropriateness of the use of the term ‘tradition(s)’ as applied to qualitative research, has been debated in the literature (Atkinson, Delamont, & Hammersley, 1998; Hamilton, 1994). One argument against the use of the term traditions is that the notion of tradition is too constraining for the work of qualitative researchers. However, Jacob (1989) argued that the term is a useful heuristic for conducting research in the social sciences. Working within a tradition, one adheres to basic assumptions, foci
of study, and methodologies that frame and orient the work (Jacob, 1987). This does not mean that one must remain within a single tradition; rather it is possible to combine traditions (Jacob, 1989).

Since the focus of this research was to explore the types, sources, perceived relevance and enacted effects of knowledge acquired during a pre-service secondary physical education teaching internship, I sought a tradition that focused on the process of knowing, which emphasized the role of interaction. Also, I believe that students are likely to interpret the information provided to them by various sources differently based upon their background experiences, beliefs, and prior knowledge. Thus, a tradition, which celebrates the interpretive aspect of interaction, was necessary. Furthermore, it is my belief that there is no single way of learning content, but rather each individual will develop knowledge based on a number of factors, such as personal experience, references, and contacts with others to name a few. The tradition that best aligns with my research purposes and beliefs is symbolic interactionism. Briefly,

Symbolic interactionists assume that each individual’s experiences are mediated by their own interpretations of experience. These interpretations are created by individuals through interaction with others and used by individuals to achieve specific goals. Symbolic interactionists are interested in understanding how these interpretations are developed and used by individuals in specific situations of interaction (Jacob, 1987, p. 27).

More specifically, the symbolic interactionist makes some specific assumptions about human nature and society. According to Blumer, (1969) the work of symbolic interactionists rests on three premises. The first premise is that “human beings act toward things on the basis of the meanings that the things have for them” (p. 2). This differs from the beliefs of many psychologists and sociologists. Some psychologists would
suggest that human behavior can be explained as the result of factors such as external stimuli, motives, perception, and cognition. Other sociologists would explain behavior as the result of factors such as social position, roles, and pressures, group affiliation, and status demands to name few. In contrast, social interactionists assume the position that

. . .the meanings that things have for human beings are central in their own right. To ignore the meaning of the things toward which people act is seen as falsifying the behavior under study. To bypass the meaning in favor of factors alleged to produce the behavior is seen as a grievous neglect of the role of meaning in the formation of behavior (Blumer, 1969, p. 3).

The second premise of social interactionism is that “the meaning of such things is derived from, or arises out of, the social interaction that one has with one’s fellows” (p. 2). Meanings are thus social products or creations that are formed by people through interacting with others.

The third premise states that, “these meanings are handled in, and modified through, an interpretative process used by the person in dealing with the things he [or she] encounters” (p. 2). The interpretive process involves the individual first interacting with him or herself, and then as a result of this self-interaction, select, check, suspend, regroup and transform meaning for each situation. In this manner, interpretation does not involve the “automatic application of established meaning but is a formative process in which meanings are used and revised as instruments for the guidance and formation of action” (p. 5).

Participants

Participants taking part in this investigation were ‘purposefully selected’ as they would be able to provide ‘information rich cases’ which would allow the investigator to
“learn a great deal about [the] issues of central importance” (Patton, 1990, p. 169).
Since the focus of this investigation was on the sources of knowledge student teachers acquired when teaching unfamiliar and familiar content, student teachers were selected based on their prior knowledge of the content to be taught. Two students, one male and one female, who were enrolled in a Master’s of Education program at a large midwestern university, and who were completing a secondary physical education teaching internship as part of their program requirements for teacher certification, acted as participants for this study. As part of their assigned duties at the schools in which they were placed, both participants were required to teach a unit of familiar and unfamiliar content. Thus, two students were purposefully selected who held diverse variations in content knowledge prior to teaching. This sampling procedure is known as maximum variation sampling (Patton, 1990). I selected this approach because I believed that a natural contrast could be more evident when viewing opposite situations.

Gaining Access
At the time this research was conducted, I was a doctoral candidate attending the same university as the participants in this study. Part of my teaching responsibilities as a graduate student included the supervision of student teachers. Prior to completing their secondary teaching internship, at the time in which this study was conducted, all students in the teacher education program completed an elementary teaching internship the previous quarter. During that time, I was assigned four student teachers to supervise. This allowed me to establish relationships with some of the students half way through their teacher training. Also, I had taught some of the students in their undergraduate
courses. As a result, I was known to most of the students prior to beginning this study. In an effort to seek volunteers for the study, I emailed all students who were enrolled in the secondary methods course and who would be completing their secondary teaching internship. In the email, I briefly explained the study and asked students if they would be willing to volunteer.

Six students responded. I contacted each respondent by phone, and discussed their familiarity with the assigned teaching sites and the content they would be teaching. In the end, there were two student teachers fitting the criteria for participation in this study. After explaining the research project to them both, they were again asked if they would act as participants. Both agreed. Following their agreement, the researcher approached their cooperating teachers, explained the study to them, and asked them if they would be willing to participate as well. The cooperating teachers also agreed to participate. The student teachers, the cooperating teachers, and the schools were given pseudonyms to assure confidentiality and anonymity. Permission to conduct the study was also provided by the Human Subjects Review Committee at The Ohio State University (protocol number 99E0116). Participants signed informed consent forms prior to engaging in the study (see Appendix B).
Assessing Subject Matter Expertise

Since this study examined the development of knowledge for pre-service teachers teaching familiar and unfamiliar content, it was necessary to assess the participant’s lack of familiarity, and familiarity with the content they were required to teach. This was done in two ways. First participants filled out a rating scale to assess their perceived knowledge of various content likely to be found in a secondary curriculum and their ability to teach the content (Schempp, Manross, Tan, & Fincher, 1998). See Appendix C. Secondly, to probe the depth of knowledge and experience of the content the participants were teaching, a background interview was conducted (Grossman, 1990, Schempp, Manross, Tan, & Fincher, 1998). See Appendix D.

Participants were first asked to rate their knowledge of content and ability to teach a variety of different content areas using a checklist. The checklist was created by consulting various sources (Pangrazi & Darst, 1997; Stillwell & Willgoose, 1997; and Wuest & Lombardo, 1994). From the sources consulted, a list of activities was compiled and an initial rating scale was constructed. The initial rating scale was sent to three physical education teacher education graduate students for review. All three graduate students had studied the use of rating scales in graduate level research methods classes. Knowing the graduates personally for two years, I felt they were qualified to complete the task. As well, all three graduate students had taught content which they perceived they were unfamiliar and familiar with at both the public school level and the university level. As a result of their prior experiences, the graduate students felt qualified to complete this task. The graduate students were made aware of the purpose of the study
and asked to review the scale for overall clarity and to ensure the scale would provide a fairly accurate assessment of the participants’ familiarity with various content areas. Several suggestions to improve the wording of directions, the numerical rating scale itself, and the presentation of the rating scale, were offered by the reviewers. The changes were made and the scale was sent back to the reviewers. With the changes made, the reviewers found the rating scale to be suitable for the needs of this study. Having completed the rating scale sheet themselves, the reviewers also believed it adequately identified various content areas, and their perceived ability to teach each content area. The final rating scale consisted of a list of 66 different activities that were compiled under 9 subheadings. Blank spaces were provided at the end of the rating scale for participants to list any activity that may have been missed. The participants were asked to rate each content area, and their ability to teach the content, using a 5-point rating, with “1” equaling “no knowledge” and representing the lowest level of knowledge of content and “5” equaling “excellent” and representing the highest level of knowledge of content. The same scale was provided for participants to rate their ability to teach the content. The rating scale was administered to the participants prior to the background interview. A copy of the rating scale can be found in Appendix C.

Prior to teaching the units that were the focus of this study, a background or initial interview was conducted with each participant to further probe the depth of knowledge and experience the participants had with the content they were teaching. The interview protocol was based on previous research that also examined knowledge development in teachers (Grossman, 1990). Grossman’s (1990) original interview questions were
specific to the study of teaching English, so the questions were modified in an effort to elicit similar information in a physical education context. The modified questions were pilot tested on a teacher not involved in this study to ensure that the questions would indeed provide the information the investigator was seeking. The questionnaire can be found in Appendix D.

Data Collection Procedures

A variety of qualitative techniques were used to collect and analyze incoming data. More specifically, the researcher engaged in non participant observations, document analyses, stimulated recall of videotaped classes, both formal and informal interviews, and conference analysis.

Non Participant Observations

According to Guba and Lincoln (1981),

direct observation, maximizes the inquirer’s ability to grasp motives, beliefs, concerns, unconscious behaviors, allows the inquirer to, live in their [participants] time frames, to capture the phenomenon in and on its own terms, and to grasp the culture in its own natural, ongoing environment; provides the inquirer with access to the emotional reactions of the group, and allows the observer to build on tacit knowledge, both his [sic] own and that of members of the group (p. 193).

As participants taught the units that served as the focus for this study, the researcher observed a number of classes. Initial observations were somewhat unstructured as the researcher was attempting to develop a sense of what was salient. Observations became increasingly more focused as more information and insight was acquired (Lincoln & Guba, 1984).

The unit of unfamiliar content for participant one, Jaimie, was team handball. This unit lasted one week. In reality, this amounted to either a three or two day unit. The
unit was three days for those students who were scheduled to attend physical education classes on Monday, Wednesday, and Friday. Students enrolled in the music program received physical education two days per week, Tuesday and Thursday. The researcher was present all five days to observe one class each day when Jaimie was teaching team handball. See table 3.1.

The unit of familiar content Jaimie taught was track and field. Initially Jaimie had stated that her track and field unit was scheduled to be two weeks in duration. This would mean that students in the Monday, Wednesday, Friday classes, would have six classes in total and students in the Tuesday/Thursday classes would receive four track and field classes. In reality, the unit lasted three weeks, but days were lost to fitness testing (post test from a test conducted at the beginning of the academic year) and the Memorial Day holiday. In total, eight track and field lessons were taught to the Monday, Wednesday, Friday classes and five track and field lessons were taught to the Tuesday/Thursday classes. The researcher observed six of the eight Monday, Wednesday, Friday classes and four of the five Tuesday/Thursday classes. See table 3.1.

The second participant, Steven, was scheduled to teach archery, the unfamiliar unit of content, and fitness, the familiar unit of content. Steven’s schedule was such that the units lasted for four and a half weeks. Fitness was offered on Tuesday’s and Thursday’s and archery was taught on Monday’s, Wednesday’s, and Friday’s. In total, 15 archery classes were scheduled to be taught. However, due to a field day scheduled on day 1, the cooperating teacher’s absence one day, one day out due to illness of the participant, the Memorial Day holiday, and a free day due to lack of student attendance, a
total of 10 archery lessons were actually taught. The researcher was present for 8 of the 10 lessons. A total of 9 fitness classes were taught during the course of the study. Out of the 9 classes, the researcher was present for 5 of the classes. During observations, handwritten field notes were taken. Some of the observations that the researcher recorded included, instructions given, students’ responses to the instructions, feedback, changes in the deviation from intended lesson plans, and student behavior that was not addressed (both on and off task). Often, information obtained from these observations served as a stimulus for interviews that took place following the lessons. All field notes were transcribed and used as data. See table 3.2.

**Document Analyses**

A document is “any written or recorded material that was not prepared specifically in response to a request from the inquirer” (Lincoln & Guba, 1984, p. 277). Documents provide “a behind the scenes look at the program that may not be directly observable and about which the interviewer might not ask appropriate questions without leads provided through the documents” (Patton, 1990, p. 245). Documents used as data in this study were students’ unit plans and lesson plans, university supervisor field notes, and transcribed conversations that occurred between the participant and their cooperating teachers.

Unit plans and lesson plans were used to generate questions that were later addressed in interviews and observations (Patton, 1990). For example, one of the research questions in this study focused on the sources of the student teachers’ knowledge. Student teachers were questioned to determine where they acquired the
information that was put into their lesson plans. Observations focused on the extent to which the unit and lesson plans were followed, and interviews were conducted after the lesson to explore why the lesson plans were carried out as planned or why they deviated from the planned lessons.

Both participants provided the researcher with copies of their unit plans prior to any observations. The researcher was thus provided with four unit plans. Jaimie provided the researcher with both her team handball and track and field unit plans. Steven provided the researcher with both his archery and fitness unit plans. Individual lessons plans were provided to the researcher upon arrival at the site to observe and videotape the various classes. The lesson plans provided upon arrival to the site, were those lessons the researcher would be observing.

Graduate students from the university in which the participants were enrolled, were assigned as university supervisors. Their role was to act as a liaison between the university and the schools in which the participants were teaching. They were also responsible for conducting weekly visits to the sites, observing classes, providing feedback, ensuring the participants were demonstrating appropriate teaching behaviors, and formally evaluating their progress.

The university supervisors assigned to Jaimie and Steven had both taken a graduate course in the supervision of student teachers. Jaimie’s university supervisor was a first year Ph.D. student and Jaimie was the first intern she had supervised. Steven’s university supervisor was a second year Ph.D. student and had supervised students the previous year in both the elementary and secondary settings. Both supervisors conducted
weekly observations and recorded their observations. Their recorded observations were in the form of systematic coding of specific behaviors and or anecdotal notes. With the permission of the participants, both supervisors provided the researcher with copies of all the documentation collected on the participants.

Both participants were assigned to work with a cooperating teacher. As part of their role as cooperating teachers, the teachers were supposed to engage in regular discussions with the intern about their teaching. Jaimie and her cooperating teacher did not engage in regular discussions. However, Steven and his cooperating teacher Julie, did engaged in regular discussions. These discussions generally occurred during the final period of the day when they were scheduled to supervise students who were removed from their regular classes. Julie and Steven agreed to tape record their discussions and allowed them to be used as data. Five discussions were actually tape-recorded. The tapes were transcribed and used as data.

**Stimulated Recall Using Videotaped Classes**

Subject matter knowledge has been shown to influence classroom interaction (Grossman, Wilson, & Shulman, 1989). Stimulated recall, using videotapes, is a data collection strategy, which uses the viewing of videotaped lessons or sections of a lesson (McConnell, 1985) “to aid a participant’s recall of his [sic] thought processes at the time of that behavior” (Calderhead, 1981, p. 212). Cues provided by the videotape were meant to stimulate the participant’s thoughts and allow the subject to relive the event and recall their thoughts during the episode (McConnell, 1985). The stimulated recall procedure is best conducted within 24 hours of the teaching episode but since the
videotapes act a stimulus for recall, the procedure has been found to be successful when used as much as one week after the teaching episode (McConnell, 1985).

Various video taped clips were selected for use. While viewing the tape and selecting clips for use, the researcher looked for a variety of different behaviors. Some examples of behaviors looked for included, episodes where the participant changed the activity from one drill to another, when they were standing around saying nothing, when they were giving instructions that appeared vague, when the participant began to present one activity and then changed the activity mid point through either the presentation of the activity or when the students were practicing the activity. Other clips were selected that focused on the behaviors of students. For example, students that were struggling with the drill, others that appeared to find the drill easy, and students that were completing the drill incorrectly.

Since a video recorder with a build in mini screen was used to tape the classes, the video camera was also able to act as the television for the participants to view the video clips. When video clips were used, the participant would be shown the video clip (using the video camera) during a post lesson discussion. Participants were first shown the video clip, then re-shown the same video clip and asked to respond to a question by the researcher. For example, participants were asked why they simplified, extended, refined, or applied the task. They were sometimes asked what they were thinking about or looking for when they appeared to be standing or moving around the activity area without saying anything for periods of time. The participant could view the video clip as often as they liked.
From the discussion generated by the videotape, I searched for evidence of various types of knowledge used throughout the lesson, and attempted to identify the origins of this knowledge. Information gathered from all stimulated recall commentaries was tape-recorded, transcribed, and analyzed using grounded theory methodology (Corbin & Strauss, 1990; Strauss & Corbin, 1990).

During Jaimie’s team handball unit, two of the three Monday, Wednesday, Friday classes were videotaped. Both of the Tuesday/Thursday team handball classes were videotaped. During the track and field unit, four of the eight lessons scheduled for the Monday, Wednesday, Friday classes were videotaped and three of the five lessons scheduled for the Tuesday/Thursday classes were videotaped. See table 3.1.

Clips of a previous teaching episode followed by questions and discussion were shown to Jaimie at least once per week. During the team handball unit, a clip from Tuesday’s class was viewed on Wednesday and clips from Wednesday’s and Thursday’s classes were viewed on Friday. During week one of the track and field unit, a clip from Wednesday’s class was viewed two days later on the Friday. During week two of the track and field unit, clips from Friday’s class were shown the next school day, which was Tuesday of the following week. During week three of the track and field unit, a clip from Thursday’s class was shown the next day. See table 3.2.

All of Steven’s lessons where the researcher was present were videotaped. That is, 8 out of the 10 total archery lessons were videotaped and 5 out of a total of 9 fitness lessons were videotaped. See table 3.2.
For Steven, the stimulated video recall procedure was conducted a total of five times. Twice the procedure was used to discuss fitness lessons. Fitness lessons were taught on Tuesday’s and Thursday’s. The researcher was present every Thursday. Clips of the first week of fitness class were used to stimulate discussion on the Monday of week two. A video clip from the third week of fitness class was scheduled to be viewed on the Monday of week four however the participant was sick and did not attend school that day, so the actual use of the lesson clip occurred on the Wednesday of week four. Video clips of the first Friday’s archery lesson were viewed on the Monday of week two; clips of Wednesday’s lesson from week three were scheduled to be viewed on the Monday of week four but due to participant illness, the viewing occurred on the following Wednesday. During the fourth week of archery, clips from Friday’s class were viewed on the Wednesday of week five. See table 3.2.

Interviews

Interviews have been described as a “conversation with a purpose” (Lincoln & Guba, 1985, p. 268) and serve many purposes. In this study, their primary purpose was to collect information relative to the sources of participants’ knowledge acquisition. Interviews provided a means of ongoing communication whereby the researcher was able to interact, question, and ask for clarification from the participants as data were continuously gathered and while observations and lesson plan perusal were carried out. They were used as a means of triangulation whereby past information or constructions were verified, amended and extended. Interviews also served to obtain background information about participants’ prior experiences, their thoughts, actions, feelings,
constructions, and other entities. They further provided a means to check for understanding and confirm interpretations.

Since the researcher was not interested in normative responses from the participants, the interviews conducted were unstructured. This form of interview stresses the participants’ definition of the situation and encourages the participant to take an active role in introducing their perceptions of what is relevant. Guba and Lincoln (1981) summarized the unstructured interview as an interview that is “concerned with the unique, the idiosyncratic, and the wholly individual viewpoint” (p. 156).

Initial interviews were conducted with both participants prior to the beginning of the study. See Appendix D. This initial interview was an attempt to gain further information about the participants' familiarity and unfamiliarity with the content and how they felt about teaching their upcoming units. Final interviews were conducted at the completion of the student teaching internship. All four of these interviews were tape-recorded. The contents of the interviews were then transcribed.

Several informal interviews were conducted following the observation of lessons. These interviews focused on what transpired during the lesson just observed. There were times when following a lesson, the participant was too tired, frustrated, or busy to talk about the lesson just observed. In these instances, the researcher would discuss that lesson the next day or after the following observation session. Discussions arising from the videotape recall sessions also occurred throughout the study. All interviews were tape recorded and transcribed. All interview transcripts were analyzed and subjected to grounded theory methodology (Corbin & Strauss, 1990; Strauss & Corbin, 1990).
Informal interviews were also conducted with the cooperating teachers. Jaimie’s cooperating teacher was not very willing to engage in discussions. As such, only two brief, informal interviews occurred with her. One was during the last day of Judith’s team handball unit, and one was during the second week of her track and field unit. Steven’s cooperating teacher was very willing to engage in informal discussions. As such, on most days, while Steven was setting up the equipment or getting ready for class, Julie and I would engage in conversation until the class began. These conversations were never tape-recorded. Rather, the researcher made notes during, or following the discussion, and when this was not possible, the conversations were documented as soon as possible afterwards.

Conference Analysis

As part of their responsibilities, the cooperating teachers were asked by the university to engage in conversations or to hold conferences with their student teachers on a regular basis. They were encouraged to provide the student teachers with feedback about their teaching, their lessons and units, and provide an opportunity to engage in professional conversations. The meetings also provided the student teachers with an opportunity to ask their cooperating teacher for help, suggestions, ideas, and opinions.

The student teacher and cooperating teacher were supplied with an audio tape recorder and asked to tape record at least one conversation per week. Jaimie and her cooperating teacher held one conference session the entire time she was completing her student teaching. She said she recorded the conversation, however, when the researcher went to transcribe the tape, it was blank. Jaimie recalled the conversation for the
researcher who later made notes on the contents of their conversation. Steven and his cooperating teacher sat down on a regular basis to hold conferences. During the first week, the researcher sat in on and recorded the conference. During weeks two and three, Steven and his cooperating teacher recorded one conversation a week. However, during week four they forgot to turn on the tape recorder. These conversations were later transcribed. Information gathered from these conferences was analyzed and subjected to grounded theory methodology (Corbin & Strauss, 1990; Strauss & Corbin, 1990).
<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
</table>
| Lesson 1  
Team Handball Observation  
Post lesson interview  
Discussion with cooperating teacher | Lesson 1 music students (MS)  
Team Handball Observation and videotaped class  
Post lesson interviews | Lesson 2  
Team Handball Observation and videotaped class  
Stimulated recall from yesterday’s class  
Post lesson interview | Lesson 2 MS  
Team Handball Observation and videotaped class  
Post lesson interview | Lesson 3  
Team Handball Observation and videotaped class  
Stimulated recall from Wed. & Thurs. classes  
Post lesson interview |
| Final Interview, team handball | Participant teaching subject not part of this study this week | | | |
| Lesson 1  
Track & Field Visit – Jaimie frustrated, brief discussion, no observation | Track & Field  
Regular scheduled class cancelled for fitness testing | Lesson 2  
Track & Field Observation and videotaped class  
Post lesson interview | Lesson 1 MS  
Track & Field Observation and videotaped class  
Post lesson interview | Lesson 3  
Track & Field Observation  
Stimulated recall from Wed. class  
Post lesson interview |
| Lesson 4  
Track & Field Observation and videotaped class | Lesson 2 - MS  
Track & Field Observation and post lesson interview | Lesson 5  
Track & Field Observation  
Post lesson interview | Lesson 3 – MS  
Track & Field  
Observation and videotape | Lesson 6  
Track & Field Observation and videotape |
| Holiday | Lesson 4 – MS  
Track & Field Observation and videotape  
Stimulated recall from Friday’s class  
Post lesson interview | Lesson 7  
Track & Field  
Observation and videotape  
Post lesson interview | Lesson 5 – MS  
Track & Field Observation and videotape  
Post lesson interview | Lesson 8  
Track & Field Observation  
Stimulated recall from yesterday’s class  
Post lesson interview |
| Final Interview, track and field | | | | |

Table 3.1: Data collection timeline - Jaimie
<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit supposed to start – was cancelled due to a field day</td>
<td>Room not available – free day</td>
<td>Archery Lesson 1</td>
<td>Fitness lesson 1</td>
<td>Archery Lesson 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observation</td>
<td>Observation</td>
<td>Observation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post lesson interview</td>
<td>Post lesson interview</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archery lesson 3</td>
<td>Fitness lesson 2</td>
<td>Cooperating teacher out – free day</td>
<td>Fitness lesson 4</td>
<td>Archery lesson 4</td>
</tr>
<tr>
<td>Observation</td>
<td></td>
<td></td>
<td>Observation</td>
<td></td>
</tr>
<tr>
<td>Stimulated recall from Thursday and Friday’s class</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interview re: today’s lesson</td>
<td></td>
<td></td>
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<tr>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Archery lesson 5</td>
<td>Fitness lesson 5</td>
<td>Archery lesson 6</td>
<td>Fitness lesson 6</td>
<td>Archery lesson 7</td>
</tr>
<tr>
<td>Interview re: last Thursday and Friday’s classes, during last period</td>
<td></td>
<td>Observation</td>
<td>Observation</td>
<td>Observation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participant sick, absent from school</td>
<td>Fitness lesson 6</td>
<td>Free day due to lack of student attendance</td>
<td>Fitness lesson 7</td>
<td>Archery lesson 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stimulated recall from last Wednesday’s and Thursday’s lesson</td>
<td>Observation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holiday</td>
<td>Fitness lesson 8</td>
<td>Archery lesson 9</td>
<td>Fitness lesson 9</td>
<td>Archery lesson 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observation</td>
<td>Observation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stimulated recall from Friday’s class</td>
<td>Post lesson interview</td>
<td></td>
</tr>
</tbody>
</table>

| Final Interview                            |                                           |                                         |                                         |                                           |

Table 3.2: Data collection timeline - Steven
Data Analysis

Grounded theory methodology was used to analyze data. Grounded theory is an approach used by researchers in all disciplines and those who subscribe to any research perspective (Strauss & Corbin, 1990). This approach provides researchers “with procedures for analyzing data that will lead to the development of theory useful to that discipline” (p. 27).

According to Strauss and Corbin, (1990), “grounded theory is a general methodology for developing theory that is grounded in data systematically gathered and analyzed. In this methodology, theory may be generated initially from these data, or, if existing (grounded) theories seem appropriate to the area of investigation, then these may be elaborated and modified as incoming data are meticulously played against each other” (p. 273).

One of the purposes of this research was to explore the types of knowledge student teachers acquired as they taught either familiar or unfamiliar content. To this end, the researcher was familiar with the current literature with respect to knowledge and teaching. According to Strauss and Corbin (1990) literature can be used in a number of ways, two of which are to “stimulate theoretical sensitivity” (p.50) and to “provide ways of approaching and interpreting data” (p. 51). With respect to the former, “these [pre-established concepts and relationships] you may want to bring to the field where you will look for evidence of whether or not the concepts and relationships apply to the situation that you are studying, and if so, what form they take here” (p. 51). With respect to the latter, existing theory or frameworks could provide a set of concepts and relationships
that the researcher could verify or modify as a result of data gathered in the new study. For the present study, Grossman’s (1990) model of teacher knowledge was used for both these purposes.

In keeping with the procedures of grounded theory (Corbin & Strauss, 1990; Strauss & Corbin, 1990), data analysis began immediately following the first set of interviews. Data collection and analyses were conducted concurrently throughout the study to provide the researcher with an opportunity to develop and check emerging themes as the study progressed. Concurrent data collection and analysis provided a focus for further observations, and also allowed specific questions to be asked that would help further support or refute emerging themes.

More specifically, from the start of data collections, Grossman’s (1990) model of teacher knowledge was used to categorize data related to the types of knowledge sought or acquired. As data pertinent to these parts of the research questions were collected, data was classified according to the model. Each piece of data was coded to reflect the appropriate knowledge component as outlined in Grossman’s (1990) model. At times, data would be collected that did not appear to fit into any of the existing knowledge components. When this occurred, the researcher returned to the literature and modified the model. This was an ongoing, cyclical process, which continued until all data related to types of knowledge, were able to be classified accordingly.

When data had been coded by knowledge component, the researcher generated tables for each knowledge area. Here, every knowledge component was listed vertically down the page followed by two columns in which the two unfamiliar units of study were
placed. Data that had been coded into each component for each participant was listed accordingly. This allowed the researcher to ensure that data was coded similarly for both participants. The same procedures were conducted for the two familiar units of study.

Participants were regularly asked questions relative to the sources of knowledge. For example, in examining unit and lesson plans, participants were asked where ideas for different activities came from or where they learned about specific drills. During post lesson observations, and when appropriate during stimulated recall sessions, similar questions were asked. These questions were always followed with a question that addressed the relevance of each data source. These sources were listed and charted. The charts generated included sources by type of knowledge, source by relevance, source by familiar and unfamiliar, to name a few. These charts were used to uncover missing data.

Trustworthiness of Data

When conducting qualitative inquiry, the researcher is the data collection instrument. As a result, it is necessary to know something about the instrument. Prior to beginning graduate school, the researcher had taught physical education at both the elementary and secondary levels, for five years. While completing a Masters degree in Education, the researcher taught elementary and secondary methods courses to undergraduate pre-service teachers for four years. At the time of this writing, the researcher was a third-year doctoral candidate who had taken several research classes, both qualitative and quantitative. The researcher had been involved in a number of qualitative studies prior to the present investigation. Initially, the qualitative studies were conducted in groups as part of class assignments under the guidance of the course
professor. Later, the researcher engaged in a qualitative study with fellow graduate students and a university professor. Although the researcher was the primary researcher for this present investigation, an experienced university professor who regularly engages in, and teaches about, qualitative research provided regular assistance and feedback throughout the project.

*Persistent Observation*

Measures that were undertaken in an effort to ensure that credible findings and interpretations were produced included persistent observation, and triangulation (Lincoln & Guba, 1985). Persistent observation provides depth to one’s observations. The purpose of persistent observation “is to identify those characteristics and elements in the situation that are most relevant to the problem or issue being pursued and focusing on them in detail” (Lincoln & Guba, 1985, p.304). The researcher had a focus of study prior to entering the site; she was specifically investigating how student teachers develop their pedagogical content knowledge of subject matter when they are unfamiliar and familiar with the content. During the units of focus for this study, observations were conducted regularly for the duration of the unit and extensive conversations with the student teacher occurred regularly.

*Triangulation*

Triangulation involved gathering information from either a number of sources, methods, investigators, and theories, in an effort to ensure that the findings found would be credible (Lincoln & Guba, 1985). For this investigation, both different sources and different methods were used. Sources of information included lesson plans, dialogue
from conversations with the student teachers and cooperating teachers, and observation notes. Methods used to gather these sources included interviews, non-participant observations, and videotaping classes. Information found in one source was compared against information found in other sources.

Peer Debriefing

A third technique used to ensure credible findings was peer debriefing. Peer debriefing “is a process of exposing oneself to a disinterested peer in a manner paralleling an analytic session and for the purpose of exploring aspects of the inquiry that might otherwise remain only implicit within the inquirer’s mind” (Lincoln & Guba, 1985, p.308). The purpose of peer debriefing is to keep the investigator ‘honest’ by having an outside person probe biases, explore meaning, and clarify interpretations. The researcher used the peer debriefer to help test working hypotheses and suggest possible next steps in the project. Finally, the debriefer acted as an emotional sounding board, allowing the researcher to air her thoughts, feelings, frustrations, and triumphs. For this research project, a fellow third-year graduate candidate acted as a peer debriefer. The researcher and the debriefer met regularly (weekly) and discussed data as the researcher analyzed it. Following each debriefing session, written notes were kept by the researcher and the debriefer.

Negative Case Analysis

Negative case analysis was also used as a technique to further establish credibility. Continuously throughout data analysis process as hypotheses were being formulated, the researcher sought disconfirming data and when found, the hypotheses
were revised to incorporate all data (Lincoln & Guba, 1985). For example, after an initial interview with Jaimie, she stated she had gathered a number of books in an effort to construct her team handball unit. Perusing her unit plan, the reference section did support her earlier statement. Therefore, questions geared at clarifying this discrepancy ensued so that an accurate hypothesis about the sources of knowledge could be generated.

**Member Checking**

A final technique used to establish credibility was the use of formal and informal member checks (Lincoln & Guba, 1985). Informal checking occurred throughout the period of data collection. Here, the researcher produced a verbal summary of the previous session for the participants and asked for their comments. When participants disagreed, they stated their disagreement. This occurred once for Steven. As a result of the disagreement, a discussion ensued in which he further explained his actions. A verbal formal member check occurred with each participant following data collection and analysis. Since informal discussions about the findings occurred as the research was conducted, during the formal discussion the participants reiterated their previous agreement. A written copy of the final version of the findings was offered to both participants with an invitation to comment on the substance of the document. The participants were not interested in reading the document. An explanation for their disinterest may be that the document was long and that both participants stated they were extremely tired, not only from the internship, but from the demands the past three quarters had placed on them.
It was not the intention of the researcher to produce findings and establish hypotheses that were generalizable or transferable to the larger population. It was the intention of the researcher to provide “thick rich description” that would “enable someone interested in making a transfer to reach a conclusion about whether transfer can be contemplated as a possibility” (Lincoln & Guba, 1985, p. 316).
CHAPTER 4

FINDINGS

The purpose of this investigation was to examine and describe knowledge development in student teachers during a teaching internship in secondary physical education, when the student teachers were teaching content they perceived was unfamiliar or familiar. The focus of this investigation was on the types, sources, perceived relevance, and enacted effects of the knowledge student teachers acquired as they learned to teach. To this end, the participants each identified two units of content; one in which they perceived themselves as being unfamiliar with the content and a second unit in which they perceived themselves as being familiar with the content. The major question guiding this study was, what influences the development of pre-service teachers’ pedagogical content knowledge (PCK) during a secondary physical education teaching internship? More specifically:

R.Q.1. During a secondary physical education teaching internship, what are the types, sources, and perceived relevance of knowledge acquisition when teaching content perceived to be unfamiliar?

R.Q.2. What are the enacted effects of knowledge acquisition on the student teacher and/or students when teaching content that is perceived to be unfamiliar?

R.Q.3. During a secondary physical education teaching internship, what are the
types, sources, and perceived relevance of knowledge acquisition when teaching content perceived to be familiar?

R.Q.4. What are the enacted effects of knowledge acquisition on the student teacher and/or students when teaching content that is perceived to be familiar?

This section will present the results of the two cases investigated. Each case will begin with general information about the participant, followed by the pedagogical skills the participant acquired prior to the internship under investigation, and then describe the units the participant taught that acted as the focus for this study. Following this, the research questions guiding this study will be addressed. The framework used to present the results will be Grossman’s (1990) model of teacher knowledge (appendix A). Centered, italicized, headings will indicate what Grossman (1990) refers to as one of four general areas of knowledge: subject matter knowledge, general pedagogical knowledge, pedagogical content knowledge, and knowledge of context. Contained within each of the four general areas of knowledge are three or four specific knowledge components. Each specific knowledge component for which there is data, will be outlined and the results relative to that particular component will be presented. When presenting the results, the intention is to first outline the type of knowledge, then discuss the source of the knowledge, followed by the participants’ perception of whether the knowledge was relevant. The enacted effects will follow the ‘types, sources, and perceived relevance’ discussion. In both cases, there is information that fits into the knowledge of context area that pertains to both the unfamiliar and familiar unit for each participant. To avoid repetition, this knowledge area will be presented immediately following the ‘general
information’ that has been provided for each participant. Where there is knowledge of context data available specifically relating to the individual case being discussed, such information will be presented within the appropriate case.

Case One - Jaimie

General Information

The Pre-service Teacher

Jaimie was a graduate student at a large mid-western state university. She was completing her Masters of Education degree, specializing in the teaching of physical education. She was in her fourth quarter of a five-quarter program. During the third quarter, Jaimie’s course work involved a secondary physical education methods class as well as a 10-week teaching internship, where she was assigned to teach physical education to suburban middle-school students. The previous quarter Jaimie had completed an elementary physical education methods class along with a 10-week teaching internship, where she taught physical education to elementary students at two urban elementary schools. The previous year, Jaimie had graduated from the same institution with a physical education degree. The physical education degree did not include teacher certification.

Pedagogical Skills Learned Prior to the Secondary Field Experience

The secondary internship Jaimie was completing at the time of this study was the second and final internship required for completion of her Master of Education degree. During her 10-week elementary internship that was completed the previous quarter, Jaimie gained an abundant amount of pedagogical knowledge. Her university supervisor
visited at least once a week to observe and provide comments on her teaching. Her cooperating teacher observed and coded various teaching behaviors and provided written comments on a regular basis. The information Jaimie received about her teaching from both her university supervisor and cooperating teacher and the progress she made, can be seen in the following examples.

At the beginning of the elementary internship, university supervisor observation notes comment on the need for Jaimie to keep her back to the wall to better observe the entire class (university supervisor notes from February 4, 1999), with no incidences of the [back-to-the wall] behavior recorded on Feb. 8, and [back-to-the wall] was indicated as a behavior to maintain on Feb. 17 and 25. Early in the internship, both the university supervisor (February 4, 11, & 17) and cooperating teacher (February 1, 2, 3 4, 5, & 9) provided comments related to improving the amount of students’ time on task, and offered strategies for addressing this issue. By March, comments indicated progress in this area. For example, “time on task has improved relative to the same lesson last week” (university supervisor field notes, March 5) and “better transitions as a result of explaining more clearly how they [students] would rotate” (university supervisor field notes, March 5). Although time on task had improved over the course of the practicum, the university supervisor felt there was still room for improvement (final evaluation, March 16, 1999) but was encouraged as she wrote, “[Jaimie] is able to provide suggestions when asked/prompted about how the activity could be improved next time it is taught” (university supervisor field notes, March 11, 1999).
Jaimie was aware of the need to teach and reinforce self-management skills. For example, waiting for all to be quiet, reminding students to listen, reinforcing positive behavior (university supervisor field notes, February 8, 1999), and the use of time out, (university supervisor field notes, February 11, 1999) were recorded as strategies that were used during her field experience. University supervisor field notes provided suggestions for improving demonstrations (February 8, 1999). Progress was documented when the cooperating teacher commented on the short length of and conciseness of demonstrations a few days later (cooperating teacher field notes, February 10, 16, & 17, 1999). Type and frequency of feedback was recorded by the cooperating teacher on February 2, 8, 10, and 18 with the majority of skill feedback falling in the general category. In some instances, the number of behavioral feedback statements outnumbered skill related feedback statements. By March 3, the cooperating teacher had commented that Jaimie’s positive specific feedback was “getting better” (cooperating teacher observation notes, March 3, 1999). Feedback across space was another teaching behavior that improved over the course of the practicum. In February, the university supervisor and cooperating teacher informed Jaimie that they would both like to see more use of feedback across space (field notes February 17, 25). A few weeks later, the cooperating teacher commented on her, “good use of feedback across space” (March 3 & 5, 1999). By the end of the internship, Jaimie was also using teaching cues on a regular basis, in an effort to aid student performance. Her cooperating teacher noted, “good use of cues” (cooperating teacher field notes, February 8 & 9, 1999) and “cues were great, remind students to say them out loudly” (cooperating teacher field notes, March 3 & 5, 1999).
Jaimie was also able to move around the gymnasium to work with individual students.

On the three occasions where Jaimie’s movement patterns throughout the activity area were recorded, diagrams indicated she did not stay in one spot. Rather she moved around the perimeter several times, moved in and out of the middle on occasion, stopped periodically to remind students how to hold the ball, (university supervisor field notes, February 4, 1999), gave warnings, waited for students to provide feedback or gave further instructions (cooperating teacher field notes, February 5, 10, & 25).

On her final elementary teaching evaluation, Jaimie’s university supervisor summarized her performance over the course of the practicum by saying,

Jaimie, you have made some pretty significant improvements over the course of this internship. Your classes are beginning to run smoothly and I am beginning to see some ‘teaching’ going on as opposed to simply ‘instructing’ (merely stating tasks for students to do). With some more experience, I think you will become a very effective elementary teacher. Good work! (university supervisor ‘student teaching supervision - final evaluation’ form, March 16, 1999).

*The Units*

As part of her assigned duties, Jaimie was required to teach team handball, ultimate frisbee, and track and field. The team handball and frisbee units were each a week in duration, whereas track and field was scheduled for two weeks. Thus, during a week-long unit, the students Jaimie referred to as the “non music students” would receive instruction for three days, Monday, Wednesday, and Friday, and the students Jaimie referred to as the “music students” would receive instruction the other two days of the week.
Two units served as the focus for this study. Jaimie stated that she was unfamiliar with the content of team handball, the first unit. The second unit, track and field, was a unit that Jaimie perceived she was familiar with the content. When Jaimie completed the activities rating scale, she stated that she had a good knowledge of content in ‘track and field’, and believed she possessed a good ability to teach the content of track and field. This was evidenced as she circled all “4”s, on a 5-point scale (5 being the highest) for each of the following activities: distance running, sprints, hurdles, long jump, and shot put. A “2” was circled for knowledge of high jump content, and a “1” was circled for ability to teach high jump. However, high jump was not an activity included in her unit. During the initial interview, Jaimie stated that her track and field background included two years of experience as an athlete at the middle-school level, that she had taken a track and field activity course as part of her undergraduate degree, that her secondary methods instructor had conducted a two-day workshop on track and field and provided the students with an information booklet, and that she watches track and field on television. Jaimie’s father was a high school track and field coach and had been coaching for years. Although some may feel that the experiences described are not necessarily extensive experiences with a particular content area, Jaimie perceived that they were enough to make her feel at ease and comfortable with the content. During the initial interview, she stated she had minimal reservations about teaching the content in her track and field unit. Her main concern was whether she was capable of knowing her students’ abilities well enough to provide appropriate progressions. As she stated, I don’t want to start them off too low and I don’t want to start them off too high expecting that they know too much. I want to make sure that it’s
interesting and appropriate and doesn’t get boring. They’re not going to want to do it for two weeks (initial interview, p. 2).

Jaimie perceived herself to be unfamiliar with team handball, the second unit that was examined for this project. On the activities rating scale beside ‘team handball’ a “1” on a 5-point scale was circled for both knowledge of content and ability to teach the content. During the interview, Jaimie was asked how comfortable she felt going in to teach the content. She replied,

. . . not very comfortable. Well, a little comfortable. I know there is the element of creating space and that element of it is similar to soccer. I have a soccer background so I can understand that part of it, but the actual rules of the game, I’m not sure of those at all. I’ve no clue (initial interview, p. 1).

Further evidence of Jaimie’s lack of knowledge about team handball can be found in an interview that was conducted approximately four days after the initial interview and half way through the unit. During Wednesday’s lesson as part of the culminating activity for that day, Jaimie had included a game in which the students were required to catch the ball behind a specified line in order to score a point. She was asked about the relationship between the game she chose for the daily activity and a team handball game. She replied by saying, “I’m thinking that the only thing about it being similar would be the scoring. You have to get behind the line to receive the ball to get a point” (Wed. May 5, 1999, p. 2). The researcher stated that in team handball you have to throw the ball into a net to score a point. She responded by saying, “Wow, I thought a goal was catching it behind the line. You see my knowledge on team handball is not very good” (Wed. May 5, 1999, p. 2).
Research Questions

With some background information provided, it is at this point that the specific research questions will be addressed. However, before moving into a discussion of the types, sources, perceived relevance, and the enacted effects of the knowledge sought and acquired for each participant and the individual units, the knowledge of context area will be discussed. Some information is equally applicable to both the unfamiliar and familiar unit of content. Therefore in an effort to simplify by not repeating, the information presented below will only be discussed once. The following is knowledge of context information applies to both the familiar and unfamiliar unit of content for participant one, Jaimie.

Knowledge of Context

The knowledge of context area includes four components. The first component is knowledge of the school and includes “the school ‘culture’, departmental guidelines, and other contextual factors at the school level that affect instruction” (Grossman, 1990, p. 9). The second component is knowledge of students, which refers to knowledge about the particular students in the school in which one is working. The third component includes knowledge of the district and this refers to an awareness of the “opportunities, expectations, and constraints posed by the district” (Grossman, 1990, p. 9). The final component in this area is knowledge about the community, and refers to knowing the characteristics of the community in which the school is located. In the knowledge of context area, data are available for the knowledge of school and knowledge of students categories in this study. There was no evidence to suggest that Jaimie sought or received
knowledge about the community or the district during the duration of this research project.

**Knowledge of Context: School**

Included in the knowledge of school component is knowledge about any contextual factors that may influence instruction. The contextual factors relative to Jaimie’s case include class time, space and equipment, the school’s music program, physical education personnel, the existing physical education program, and the school’s discipline policy.

**Class time.**

The amount of time one has to teach a particular class of students directly influences instruction in that it dictates how much time each day one has for instruction. Jaimie’s classes were structured to provide eight 40-minute blocks throughout the day, beginning with a 30-minute homeroom period from 8:00 a.m. to 8:30 a.m. Part of Jaimie’s responsibilities included lunch duty from 12:10 to 12:50 followed by lunch intramural supervision from 12:54 to 1:34 in the afternoon.

**Space and equipment.**

The space one has available to teach and the equipment available for use are obvious contextual factors that influence instruction. This information was easily obtained by observing the school, the school grounds and the equipment room. The school in which Jaimie completed her secondary internship was in a suburban area of a large mid-western city. The school was of average size and one level. The space available for Jaimie to teach her track and field unit included a gymnasium, a paved
outdoor area approximately the size of two small basketball courts, and a grassy playing field. A walking path that surrounded the field was also used during the track and field unit. Starting in the northwest corner of the playing field, an asphalt walking path extended down along and around the perimeter of the south west and south east corners of the playing field. As the path circled up to the northeast side of the playing field, it cut through the top quarter of the northern part of playing field and connected to the path circling the opposite side of the field. Jaimie used this asphalt walking path as a track to conduct her sprints and distance runs. The paved outdoor courts and the playing field were easily accessible through doors located on each end of the gymnasium.

With regards to track and field equipment, there was no track, but as previously stated, the asphalt walking path that circled the majority of the playing field was used for running events. Softballs were used in place of shot puts. There were no sand pits for the long jump events so Jaimie used a measuring tape that was taped to the gymnasium floor and students jumped across the gymnasium floor. The school did not possess any hurdles but Jaimie was able to borrow some from a local university. These hurdles consisted of pylons into which plastic rods with a curve at one end, shaped liked half a hurdle, fitted into the tops of the pylons.

The space available to teach the team handball unit included one gymnasium, a paved outdoor playing surface, which was the size of two basketball courts, and a grassy playing field. The school’s equipment pool did not include any actual team handballs. A variety of balls including, basketballs, volleyballs, soccer balls, baseballs, and sponge (nerf) balls were available. Jaimie originally began the unit using small whiffle balls but
quickly changed to small sponge balls, as she felt the students were not proficient enough catching the smaller balls. A graduate student at a local university, who was quite knowledgeable about team handball, presented a brief lesson to one of Jaimie’s classes. According to Jaimie, “he also talked about how the ball was about the same size as the nerf balls we had” (post lesson interview, May 7, p. 1).

*The music program.*

Another contextual factor present in the school in which Jaimie was teaching was the school’s music program. The music program affected instruction, as the amount of physical education a student received was dependant upon their enrollment in a particular music program. All students in grades 6, 7, and 8 had to enroll in one of two music programs. They could enroll in what was known as the ‘music majors’ program or the ‘non-music majors’ program’. According to the school’s guidance counselor, choice of program was dependant upon the students’ individual interest level. If students selected the ‘music majors’ program’, they would attend music class on Mondays, Wednesdays and Fridays every week for the entire year. If the music majors’ program was selected, students would then select one of two performance areas in which they would study. One area was referred to as orchestra. Here, students learned to play an instrument, become a member of the school band, and participate in band activities. The second area of the music majors program was referred to as the vocal program, where students focused on singing. These students were generally the majority of the choir members. Instruction in either of these performance areas took place outside the homeroom classroom with specialist teachers. For example, an instrumental specialist taught the students who
elected orchestra. Regular homework was assigned and parents were required to ‘sign off’ that their child did in fact, sing or play their instrument as instructed.

If students elected to enroll in the non-music majors’ program, they would attend music classes on Tuesdays and Thursdays. This program was described as a music appreciation program. The purpose of the music appreciation program was to broaden the students’ general understanding of music. To that end, students covered a variety of topics. For example, they would spend some time learning to play an instrument and learn to sing. In addition, students would complete music appreciation units where they would listen to and study a particular type of music, like jazz, and who the great jazz players were, how and where jazz originated, etc. A general music teacher delivered the music appreciation program in the classroom. The general music teacher was also a music specialist, but was classified as a general music specialist, whereas the teachers who taught in the music program had further training in the area they worked (e.g., vocals or instruments).

On the days that students were not in music class, they attended physical education. Therefore, the music majors attended physical education class on Tuesdays and Thursdays and the non-music majors attended physical education class on Mondays, Wednesdays, and Fridays. So, one group received physical education three days per week and the other group received physical education two days per week.
Personnel.

Other contextual factors that influence instruction include the personnel available to teach, and in cases where an intern is present, the involvement of the cooperating teacher assigned to work with the intern.

According to Jaimie, the school in which she was assigned had two physical education teachers, one male and one female. Jaimie was assigned to work with the female cooperating teacher, Ms. Sandrin, and her teaching partner Brett, was assigned to work with the male cooperating teacher, Mr. Bedard. Jaimie’s cooperating teacher had been teaching at the school for 10 years. The male cooperating teaching had been at the school for 5 years. During our initial interview, Jaimie described her cooperating teacher as pretty much uninvolved with her practicum. She stated,

Well, they pretty much say it’s up to you, whatever you want to do. They said that if we need help that they have books, but we went out and got our own books because we saw that they only had one book. When we’re at school, she really never has any time to sit down and help me, like a free period so we can work together, so that kind of makes it hard for me to get help from her (initial interview, p. 3).

Other personnel available for instruction included Brett, who was Jaimie’s teaching partner and classmate. As previously mentioned, Brett was assigned to work with Mr. Bedard. Since Mr. Bedard and Ms. Sandrin team-taught and Jaimie and Brett assumed the same routine as their cooperating teachers, Brett can be considered a contextual factor. Brett and Jaimie relied heavily on each other throughout the internship. For example, they planned all their lessons and both units together, they regularly discussed how they felt each other’s lessons went, provided feedback to each other regarding how to improve lessons, and acted as a sounding board for each other
when needed. Several times during our discussions Jaimie made reference to how much she and Brett relied on each other and helped each other.

*The physical education program.*

Jaimie gathered information about the physical education program during an initial meeting with her assigned cooperating teacher. During the initial meeting, Jaimie was informed that the two physical education teachers were assigned and scheduled to teach a separate group of students at the same time. Since there was only one gymnasium, the two teachers co-taught all classes. The two physical education teachers, Ms. Sandrin and Mr. Bedard, had been co-teaching their classes together since Mr. Bedard arrived at the school, five years prior. Jaimie and a fellow classmate, Brett, were placed at the site together and proceeded with the routines previously established by the two cooperating teachers. That is, Jaimie and Brett co-taught all classes. Continuing with the pattern already in place, the two interns determined that Brett would take the lead during the first class, Jaimie would take the lead for the next two classes, and Brett would take the lead for the fourth class. A similar routine was followed for the two afternoon classes, with Jaimie taking the lead for the first class after lunch, which was period eight, and Brett taking the lead for the final class of the day. Taking the lead for a class meant starting class and giving directions, and providing any explanations and demonstrations for that class period. The lead person would also decide when to stop one activity and begin another and when to end class. Although one intern was scheduled to lead a class, after the initial explanations, demonstrations, and directions were provided, both interns moved throughout the activity space and acted as instructors for the class.
Discipline policy.

Other information relative to this component included knowing what the school’s overall policy was with respect to discipline. For example, when describing a confrontation she had with a student, Jaimie described how she threatened to write a student up for her behavior. She stated, “So I said to her, ‘I’m going to write up a 190’” (initial interview, p. 10) and then explained that her cooperating teachers had told her and Brett that was how they were to handle discipline problems that were not corrected through means such as verbal reprimands and positive reinforcement.

The physical education departmental procedures that Jaimie learned by observing and talking with her cooperating teachers were a relevant source of knowledge as both Jaimie and her teaching partner Brett, were required to follow the procedures that were already in place. Both Jaimie and Brett continued to use the existing policies and procedures for the duration of the teaching practicum.

Knowledge of Context: Students

Student enrollment equaled 559 students, with 284 being male and the remaining 275 being female. Of the 559 total, 392 were classified as White, 145 were classified as Black, 11 were classified as Hispanic, 8 were classified as Asian Pacific Islander, 3 were classified as American Indian/Alaskan Native, and no students were classified as Multi-racial (personal communication with Ohio Department of Education help desk personnel). Approximately 17% of the total school population was classified as disabled (http://abc000.abc.state.abc.us/lrc_www/99_Build/123456.pdf). According to the school guidance counselor the majority of students, regardless of ethnic background, were
classified as middle class (personal communication). Academically, the results of state proficiency tests indicated that the 6th grade tests scores were slightly higher than the state average (less than 1%) in citizenship, mathematics, reading and science. Writing scores were almost 7% higher than the state average. Within the district, the school scored higher on all test scores, the differences ranging between 24.4% higher in writing to 31.7% higher in citizenship. The school spent $50.00 more per pupil than the state average of $5,971.00 for middle schools (http://abc000.abc.state.abc.us/lrc_www/99_Build/123456.pdf).

Upon receiving her secondary placement, Jaimie made arrangements to meet with her cooperating teacher. During her initial meeting Jaimie was informed that she would be teaching grades 6, 7, and 8 students. The students’ ages ranged mainly from 11 to 14 years with an occasional student who was a year or two older because he or she had been held back. Jaimie did have one class that included five students with hearing impairments. A special aid was always in these classes, signing the instructions given by Jaimie. During the initial days of her placement, Jaimie gathered more information about her students. This knowledge was acquired by observing students during lessons and listening and talking to students before, during, and after classes. The knowledge of students that Jaimie acquired was three fold: 1) there was a difference between what she called ‘music students and non-music students’, 2) students at the middle school level do not like practicing skills, they would prefer to play games, and 3) middle school students at the school in which she was working, were competitive.
As previously explained, students were enrolled into either the music majors program or the non-music majors program. Jaimie referred to these groups of students as the music students or the non-music students. Early in the internship, Jaimie perceived that the two groups of students were different. The quote that follows is how Jaimie described the students she was teaching,

The Tuesday/Thursday kids have a totally different mentality about themselves and how you treat others. It seems like in the Monday/Wednesday/Friday classes the hormone levels are much higher. They are mean to one another, as far as verbal abuse, like, “hey stupid, hah, hah”. They run around and bang into each other and they’re just a little bit more free spirited, whereas the Tuesday/Thursday classes are more controlled. They’ll [Tuesday/Thursday classes] come in, go right to their spots, and they’re ready. All I have to do is say something and they don’t talk. I say, “Ok, we’re ready to start” and they’ll sit down. I don’t know why they’re so different but they are. I think they have a little bit more responsibility (initial interview, p. 10).

A conversation with the school’s guidance counselor further supported Jaimie’s perceptions. According to the guidance counselor, the music students tended to be better students academically and more disciplined. The guidance counselor suggested this may be because parents bought their children expensive equipment, for example instruments or sheet music, and the parents were also required to sign off on their child’s homework. She speculated that with band or choir practices and commitments, parents of the music majors more closely monitored their children’s activities. Further, the guidance counselor described the non-music students as students more interested in physical activity. She stated, “they may miss some classes, but they will rarely miss their physical education class” (personal communication).

Observations and interactions with students in the early part of the internship led Jaimie to conclude that her students preferred to play games over taking part in skill
practice. During our initial interview when I asked her what her students were like, she stated,

They want to play games. They ask, “What are we going to do today? Are we going to play today?” We can’t get them to do things other than play games all day and then they say, “I don’t want to do that, that’s stupid! They just want to go straight out there and start playing without going through anything (initial interview, p. 14).

While Jaimie was observing her cooperating teacher during her initial days in the placement and from her brief opportunities to interact with the students, Jaimie concluded that the students she was observing were fairly competitive. During our initial interview when talking about her students, the upcoming units, and what she was preparing to teach, Jaimie stated

We tried to use things we thought would be interesting. These kids love competition, especially in most schools, it seems they love, ‘let’s play this, let’s play race the flag’. They really want to be a part of competing against each other. It’s something we really don’t understand yet” (initial interview, p. 8).

Later, half way through her team handball unit, Jaimie’s initial perceptions of her students’ participation patterns and interest in competition were reinforced when she noted that,

It took the team on this side in third period about 2-3 minutes to really get into moving. Once they saw the other team moving and scoring points they were like ‘wait a minute, we have to score some points’ and then they finally got into it. So I think the game really motivated the kids to do it themselves. They got into the game because they didn’t want to lose, they wanted to get points (post lesson interview, May 5, p. 4).

When asked directly what she learned about students after teaching her classes a
couple of times she said, “One thing I learned about kids is that they like to compete against one another. It might not be harsh competition, but just to be able to get a point and stop you from getting a point…” (post lesson interview, May 5, p.5).

The source of this information was the students themselves. This knowledge was gathered by observing and listening to students as they participated in each day’s activities. The relevance of this knowledge became obvious when Jaimie was asked if she would do anything differently when she planned future lessons as a result of this information. She stated that she would have to make her lessons “a little more interactive” and later proceeded to explain that she would have to ensure that competition amongst teams and classmates was part of each lesson, and where possible, a part of each drill.

R.Q. 1. During a Secondary Physical Education Teaching Internship, What are the Types, Sources, and Perceived Relevance of Knowledge Acquisition When Teaching Content That is Perceived to be Unfamiliar?

Subject Matter Knowledge

The general area titled, subject matter knowledge, includes three components titled content knowledge, and syntactic structures and substantive structures. Content knowledge refers to “knowledge of the major facts and concepts within a field and the relationships among them” (Grossman, 1990, p. 6). The substantive structures within a discipline are the “various paradigms within a field that affect both how the field is organized and the questions that guide further inquiry” (Grossman, 1990, p. 6). Syntactic structures in a discipline refer to “how knowledge claims are evaluated by members of
the discipline (Grossman, 1990, p. 6). After analyzing all data, content knowledge and substantive structures are the two components for which Jaimie acquired knowledge in the subject matter knowledge area. Throughout the duration of this study, Jaimie provided no evidence that she acquired knowledge relative to syntactic structures.

**Subject Matter Knowledge: Content Knowledge**

The specific content knowledge Jaimie sought was knowledge about the skills and rules of team handball as well as activities that could be used to teach the game. Sources where Jaimie attempted to find this knowledge included books, her past experiences with sport and prior coursework, and her student teaching partner Brett. Jaimie found the books she consulted to be of little relevance but did believe that her past experiences and her teaching partner were relevant sources of knowledge.

When Jaimie began to plan her team handball unit, the first thing she did was search for information about the content of team handball as she had very little prior knowledge or experience with the activity. In reference to the skills needed to play a game of team handball, Jaimie stated, “no clue, catch, throw, that’s all I know” (initial interview, p. 1). Similarly for the rules of team handball, Jaimie stated, “I don’t have a clue about the actual rules of the game. Really, I have no clue” (initial interview, p. 1). Initially, Jaimie sought information relative to the skills and rules of team handball and a few team handball related activities. Her search for this information was also an attempt to ensure that she taught the content correctly and that her students enjoyed the activity. In her words,

I want to be comfortable with the content so that I can have some activities that will be interesting instead of just drill type activities that come out of a book. I’m
kind of worried about that. I’m worried about how interesting [it will be], how the kids are going to get it, and how they are going to react to it (initial interview, p. 2).

In seeking out such information, Jaimie turned to a number of different sources. One source was “lots of team handball books out of the library. Lots and lots” (initial interview, p. 2). Although she stated that she had gotten a number of books from the library, (initial interview, p. 2), she only referenced two books in her team handball unit plan. These two books were the Team Handball Steps to Success book by Clanton and Dwight (1997) and the Sport Education book, by Siedentop (1994). I pointed out in a latter interview that she had said she had gotten a lot of books out of the library but when asked where she found her ideas for the drills and activities, she always answered that they were from previous classes. When asked about this, she commented that the Steps to Success book was “way too complicated” and was listed because a reference page was required as part of the unit plan. She said she did look through the other books she had signed out, but did not take anything from them because she didn’t understand them. Through a number of conversations, the team handball books that Jaimie had acquired appeared to be of little use. When asked if she really used the textbooks she replied by saying, “we used the textbook to see ‘How does it go?’” and that she found the books she had consulted “a little confusing actually because I didn’t know anything, I’d never seen it, never really played it” (post unit interview, Monday May 17, p. 5). When asked if she understood the game after having read a number of books, she replied “a little bit, not really” (post unit interview, Monday May 17, p. 5). What she did understand about the game of team handball after reading the books and teaching the unit was,
That the game was similar to soccer in that you have to score on your opponents goal which was located at the other end of the field, and that passing was the key to moving the ball down the court (post unit interview, Monday May 17, p. 6).

Jaimie seemed to have a lack of understanding of the game of team handball that prohibited her from understanding a lot of the information contained in the books she consulted, and as a result she found the team handball books to be of little use. During a discussion about the relevance of the books she had acquired, she stated,

In team handball, for some of the different rules, it was hard to pick out something that was good because I didn’t know. I didn’t know what would be an effective drill, or what would be something good to use (post lesson interview, May 26, p. 10).

Jaimie’s past experiences in sport and activity appeared to be a more relevant source of content knowledge. In discussing where she acquired the information to help her construct her units she stated,

I would try to relate some of the experiences that I had, that I thought were similar to the particular things that I was doing. Books were not that helpful. Mostly [I relied on] experiences that I had actually participated in or seen. The team handball was a little bit of YZU but I could use stuff from my soccer or my own soccer experience or my own invasion game experience. I tried to relate that to team handball (final interview, p. 2).

A little later in the interview Jaimie again reiterated the importance of her past experiences as a source of knowledge when she stated,

We looked through a couple of [team handball] books but we really didn’t utilize them that much. We used some other games that we thought were similar to the game of team handball – games that we were more familiar with. For team handball, we used things we already knew and related it to team handball (final interview, p. 3).
Another type of experience that provided Jaimie with content knowledge was her prior course work. When asked where she got the ideas for the activities in one of her team handball lessons, she stated,

[Dr. Tawny] did these activities and we also did it with Dr. U and Dr. Smiley in both of our classes as a beginning activity to work on communication and just to get the kids into it. We did it in a couple of different classes (Post lesson interview, May 4, p. 3).

The participant found past course work to be very relevant as she used the material gathered from previous course work directly in her lessons. When asked if she felt the activity was useful, she responded with, “yes, the kids really got into it. It was a useful activity” (Post lesson interview, May 4, p. 4).

Another source for content knowledge related to team handball was her student teaching partner Brett. According to Jaimie, Brett had “a comfortable knowledge of team handball” as “he’d played before” (initial interview, p. 3) so she was relying on him for drills and fun activities. However in a conversation held after the first day of team handball when her teaching partner was asked about his experience with team handball, he replied that he had no team handball experience, but he was working from and using his rugby background. Regardless, Jaimie found Brett to be a good source of information, for she stated, “the good thing about having Brett as part of my team [is that] we help each other see different things and think of new ideas for certain activities. There are so many ways to do activities” (initial interview, p. 20).

Following the completion of the team handball unit, I asked Jaimie why she didn’t ask for help from her cooperating teacher and she stated “Because they kept saying, you can do it, it’s your thing” (post unit interview, Monday May 17, p. 15). Documented
during a conversation that occurred during the first peer debriefing session, the researcher wrote, “...I got the impression she wasn’t comfortable going to her cooperating teacher for help, that she had figured out early that her cooperating teacher wasn’t really interested in helping her” (peer debriefing notes, May 9, p. 14).

With respect to content knowledge, Jaimie “was mainly worried about the content especially in the beginning” (final interview, p. 4). To this end, Jaimie initially sought knowledge about the skills and rules of team handball as well as activities that could be used to teach the game of team handball. Jaimie looked to books, her past experiences with sport, prior coursework, and her student teaching partner Brett as sources of this knowledge. Jaimie stated the books she consulted were of little relevance but did believe that her past experiences and her teaching partner were relevant sources of content knowledge.

*Subject Matter Knowledge: Substantive Structures*

It would appear from the information gathered in the content knowledge component above that Jaimie had adopted a combination of the academic and technological orientations. Rink (1993) described the emphasis of the academic orientation in physical education as focused on “games, sports, dance and fitness” (p. 15), and the emphasis on the technological orientation in physical education as focused on “…research based teaching skill development”(p. 315). Jaimie was searching for information that would allow her to teach the game of team handball to her students. It appears that what she was looking for were drills or activities that broke down that game and the skills required to play the game. Observations of her classes also indicate that she
attempted to teach the skills required to play the sports and activities she was teaching. Conversations indicated that she had some understanding of the research related to teaching as she mentioned “increasing my ALT and got to get them into activity quickly” during discussions. As well, she mentioned the usefulness of her university supervisor when the supervisor coded various teaching behaviors, such as her feedback or the amount of time students spent engaged in activity.

It appears that this information was gathered as a result of experience and coursework. Jaimie’s prior experience with physical education were similar to the programs delivered in the school in which she was working, and were similar to the programs delivered at the elementary schools where she completed her elementary internship the preceding quarter. Also in her elementary placement, her cooperating teacher regularly coded and provided feedback on, various teaching behaviors, like Academic Learning Time, so Jaimie was aware of the importance of keeping students activity engaged in activity and leaving minimal time for students to remain idle. The behaviors coded and discussed by Jaimie’s elementary cooperating teachers were previously discussed in prior methods classes. This information was obviously relevant to Jaimie as she worked to consciously incorporate the pedagogical practices in her daily classes.

General Pedagogical Knowledge

General pedagogical knowledge is another general area of knowledge found in Grossman’s (1990) model of teacher knowledge. This knowledge area “includes a body of general knowledge, beliefs, and skills related to teaching” (Grossman, 1990, p. 6).
This knowledge area contains four components: the individual’s knowledge and beliefs about learning and learners; knowledge of general principles of instruction; knowledge and skills related to classroom management; and knowledge and beliefs about the aims and purposes of education. Classroom management and instructional knowledge are the two components from this knowledge area that Jaimie received, sought, and discussed. There is no evidence in the data gathered that indicated Jaimie acquired knowledge relative to the learners and learning component, or knowledge about the aims and purposes of education component.

**General Pedagogical Knowledge: Classroom Management**

Classroom management includes such practices as establishing a routine and outlining the rules that will govern how the class is run (Grossman, 1990). In physical education, management tasks include tasks such as entering the gym, taking roll, transitioning, organizing for instruction, regrouping, getting equipment out and away, staying on task, obeying rules for behavior and class closure (Siedentop & Tannehill, 2000). As previously discussed, safety issues are also included in this component.

Specific types of management related knowledge Jaimie received during her secondary internship included information about the daily classroom rules and routines, grouping students, improving transitions, safety, and waiting for student attention before beginning instructions. The sources of this knowledge came from her cooperating teachers and her university supervisor. Jaimie found all the classroom management information she received to be relevant.
Upon arriving at the middle school, Jaimie was introduced to the rules and routines the two full-time physical education teachers had established. This introduction occurred during the first few days Jaimie was in the school. During her initial visits, she spent most of her time observing her cooperating teachers teach and engaging in brief discussions with them. At this time, she was verbally informed how students were to enter the gym, how long they had to change, what students were expected to do when they entered the gym after changing into their physical education attire, what students were to do if they did not bring a change of clothes with them, how classes started for example, the daily warm-up, and how long at the end of class students were given to change. For example, Jaimie described how they handled the non-participant and the non-dresser. She stated,

If a student does not want to participate, we don’t let them sit there, we make them stand. And another thing we do here for those student’s who may be ill or may have forgotten their clothes, is we make them do reports. They have to do a Sports Illustrated report and it has to be done by the end of the period (initial interview, p. 19).

When asked if these were her ideas, Jaimie responded by saying, “No, they [her cooperating teachers] were already doing that when we got here” (initial interview, p. 20). Jaimie thought it was a good idea and continued the practice when she began teaching the classes full time, for as she stated,

The students actually do the reports. Their reports sound a lot like the reports in the books, but they’re cutting out pictures and you can see them processing and understanding how to put together the story to tell about the athlete or story they are writing on. I like it because at least they’re doing something that’s related to sports and participation rather than just sitting there (initial interview, p. 20).
The physical education procedures that Jaimie learned by observing and talking with her cooperating teachers were a relevant source of management knowledge as both Jaimie and her teaching partner Brett decided to follow the procedures that were already in place. Both Jaimie and Brett continued to use the existing routines and procedures for the duration of the teaching practicum.

During one of the first team handball lessons I observed, Jaimie was putting students into teams and she was doing so by asking students to volunteer to be a captain and then she had the captains choose team members. This practice was carried out in front of the entire class. This was not how she originally intended to divide students into teams. In her unit plan as one of the learning activities for the team handball unit, Jaimie wrote, “I pick captains for each class. …The captains are challenged to try to split up the teams evenly. They do not know which team they will be on. Assign captains to teams”. We proceeded to have a discussion about how her intended practice was considered much more appropriate than what she had decided to do in the end. In our initial discussion she stated they completed the task as described above because, “We didn’t know how to separate them because we didn’t know their ability, so we let them do it. We really didn’t know what else to do” (post lesson interview, May 4, p. 4). This statement was made despite the fact that such practices were discussed in methods classes, and that she outlined alternative practices in her unit plan. We revisited this topic in a post unit interview where I asked her why she didn’t ask her cooperating teachers for help. She responded by saying, “We really didn’t think to ask them what would be good teams or who would be a good person to be captain. We really didn’t ask them anything, which
was a mistake on our part” (post unit interview, May 17, p. 15). In retrospect, she acknowledged that her cooperating teachers could provide helpful information about her students if she had to divide students into teams, and if she had to do it again, she would definitely ask them for such help.

Near the end of the unit, Jaimie was asked where she got most of the information to help her present and improve her lessons. In response, she mentioned how much she relied on her teaching partner as a source of knowledge,

A lot of talk with Brett. We would go from class to class and say ‘ok, maybe next time try to do this’. So we helped each other with teaching the different students and what would work better -- like what transition to do. For example, maybe I could change this transition so that it won’t take that long a time. If we make it shorter then maybe we can keep the classes together because then it started to fall apart. Watching each other helped me a lot with the pedagogy, but it came down to a lot of trial and error to learn how to conquer these different things (final interview, p. 5).

During one of her team handball lessons, Jaimie received some other classroom management knowledge from her cooperating teachers. More specifically, this knowledge was about safety. During an observation, I noticed that in the middle of a lesson, Jaimie was called over by one of the cooperating teachers. Following the brief discussion, Jaimie proceeded to move some cones she had set out and used as markers for the game students were playing. After the lesson, I asked Jaimie what the cooperating teachers had said to her. Jaimie stated they had told her that she had placed her goals too close to the table tennis table that was stored in a corner of the gymnasium and she should move the cones (the goal). Jaimie stated that she found the information relevant, as she “would never have thought about the ping pong table or the goals” (post lesson
Her actions also demonstrated that she found the information relevant as she stated,

after (her conversation with Mr. Bedard) I moved the goals away from the ping pong table. I put two cones on the court and rather than students being allowed to score anywhere behind the line, they had to be between the line and between the two cones to score (post lesson interview, May 5, p. 6).

Jaimie’s university supervisor also served as another source of knowledge. During one of her weekly visits, the university supervisor used an ‘academic learning time in physical education’ coding sheet to code student behaviors during class. Although Grossman (1990) includes academic learning time in the instructional category, the coding instrument used by the university supervisor also provides information relative to management and transitions. There is also room on the sheet for observer comments. During one visit (May 5), the university supervisor wrote, “don’t talk when the kids are talking, make them wait before you say go, blow the whistle so kids get where you want them to go, and be firm with commands” (university supervisor coding sheet, May 5). Jaimie found this information to be relevant as the next day during a post lesson discussion the researcher asked why, during the lesson observed, she stated a number of times “I can’t talk when you’re talking” when in previous classes, Jaimie would have continued to talk even if the students weren’t quiet. She stated that in discussions with her university supervisor, it was pointed out that she should demand attention before continuing with any explanations and demonstrations. When asked if it was working, Jaimie stated yes and believed that students “caught on a lot quicker to the whole idea of the drill so they had way more time to practice” (post lesson interview, May 6, p. 4). Jaimie felt that one of the contributing factors to students catching on quicker was the
fact that students were listening to the instructions and therefore knew what they were supposed to do. She stated, “I didn’t go on when they were talking. I made sure that I waited and that everyone was paying attention to me” (post lesson interview, May 6, p. 5).

The management related issues for which Jaimie received knowledge included information about the daily classroom rules and routines, grouping students, transitioning, safety, and the importance of gaining and maintaining student attention. In these instances, her cooperating teachers and university supervisor provided her with this information. Jaimie found the information to be relevant as she incorporated what she had observed, discussed, and what had been suggested into her lessons.

**General Pedagogical Knowledge: Curriculum and Instruction**

As previously stated, Jaimie had completed a ten-week elementary physical education teaching practicum the previous quarter where she practiced, was provided feedback on, and was able to demonstrate various effective teaching techniques, such as having all students in sight (back to the wall), moving throughout the space, class management techniques, effective demonstrations, ability to provide feedback, and use of instructional cues to aid performance. The instructional issues that will be discussed below are the issues that she discussed during her secondary physical education teaching practicum. Specific types of instructional knowledge Jaimie developed during her secondary internship included the effective use of space, and improving instructions/explanations and demonstrations. The sources of this knowledge came from her cooperating teachers, her methods courses, her student teaching partner, and the
students themselves. Jaimie found all the instructional knowledge she received to be relevant.

Jaimie’s cooperating teachers did provide her with some information related to improving the quality of practice for her students. After watching three successive lessons, the researcher noticed that changes had been made from the first class to the second and third classes. During the first class, Jaimie was indoors and the class was divided into four teams and the teams were playing a modified version of ‘keep away’. Basically, two teams played against each other using half of the gymnasium. During the second and third classes, Jaimie completed the same lesson but two teams completed their games outside, with the remaining two teams playing indoors, only this time, the two teams playing indoors were able to utilize the entire gymnasium rather than only half the gymnasium. When asked why the changes were made, Jaimie responded by saying, “In between classes, Mr. Bedard and Ms. Sandrin came up to me and said, ‘You can utilize more space if you take some kids outside. Then they wouldn’t have to have such a confined space’. That’s the reason why we moved one game outside”, (post lesson interview, May 5, p. 4). Jaimie perceived this knowledge to be valuable as she stated, “It gave the other teams more space to actually move along and spread out and really experience support. For example, the teams had more room to move, and more room to pass back and forth, side to side” (post lesson interview, May 5, p. 4).

However, other than the issue related to utilizing space, Jaimie did not see her cooperating teachers as a valuable source of information. I asked Jaimie what types of information she was receiving from her cooperating teachers and she responded with
I’m not receiving very specific information. Nothing that’s helping us. For example they never say ‘that’s a good progression’ or ‘that was a good idea’, or ‘you need to think about this’. Nothing specific that has helped us to improve our teaching (post unit interview, May 17, p. 17).

When asked to be more specific about what she was learning from her co-operating teachers, she stated,

That you have to be able to think on your feet. I think that’s why they changed it [the original plan for Friday’s class] on Friday. Right when we were teaching, [they] said, “oh, you’re going to have to do this” and not anything that’s really helping me as far as my teaching, I don’t think (post unit interview, May 17, p. 17).

This sentiment was again echoed during the final interview when we re-visited the types and sources of knowledge she sought as she planned and taught her unit. In her words,

As I started teaching the different classes I think I needed a lot more help with the pedagogy part…. It took feeling like I failed. I didn’t do a very good job that period actually teaching before, so it was a lot of trial and error because I didn’t really get that much feedback. We didn’t get any from the cooperating teachers except for ok, well, Mr. Bedard would give me like, “Ok, relax and don’t worry about it. Try it again”. They just let us do it on our own. Their big thing was letting us learn how to adjust to different situations (final interview, p. 4).

Jaimie’s teaching partner served as another source of instructional knowledge. During a discussion near the end of her team handball unit, I mentioned to Jaimie that I thought her explanations and demonstrations were becoming much clearer, not only from the beginning of the week, but they seemed to improve from class to class. She mentioned that this was the result of her watching and listening to her teaching partner when he was leading the class. As she stated, “I see stuff in his [lesson] and think, that was a good idea” (post lesson interview, May 6, p. 2).
When we sat down to talk at the end of her team handball unit, Jaimie again mentioned the fact that she felt her teaching partner served as a valuable source of information over the course of the unit. When I asked her where she was getting most of her knowledge about teaching, content, and students, she stated,

Brett and I talk a lot about what’s working and not working and how we can change it. We just use each other’s ideas to help one another. Like with last period, we would ask, ‘did you see what happened here, and did that work? I don’t think that worked very well. What can I do to make it a little bit better?’ We just use each other to help make our decisions about what we’re going to do to make the class go smoother (post unit interview, May 17, p. 18).

During her team handball unit, the types of instructional knowledge Jaimie received information about included better use of instructional space, the importance of being able to think on your feet, and improving explanations and demonstrations. The sources of this knowledge came from her cooperating teachers, her methods courses, her student teaching partner, and the students themselves. Jaimie found all the instructional knowledge she received to be relevant.

**Pedagogical Content Knowledge**

Grossman (1990) uses Shulman’s (1986) definition of pedagogical content knowledge and states this knowledge area includes,

…the most regularly taught topics in one’s subject area, the most useful forms of representation of those ideas, the most powerful analogies, illustrations, examples, explanations, and demonstrations - in a word, ways of representing and formulating the subject that make it comprehensible to others. Pedagogical content knowledge also includes an understanding of what makes the learning of specific topics easy or difficult; the conceptions and preconceptions that students of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons (pp. 9-10).
Grossman included four components in the pedagogical content knowledge area. The first is knowledge and beliefs about the purposes for teaching a subject at different grade levels, which are “reflected in teachers’ goals for teaching particular subject matter” (Grossman, 1990, p. 8). Knowledge of students’ understanding, conceptions, and misconceptions of particular topics in a subject matter is the second component of pedagogical content knowledge. According to Grossman (1990), in order for teachers to generate appropriate explanations and representations, “teachers must have some knowledge about what students already know about a topic and what they are likely to find puzzling” (p. 8). ‘Curricular knowledge’ is the third component in this knowledge area and “includes knowledge of curriculum materials available for teaching particular subject matter, as well as knowledge about both the horizontal and vertical curricula for a subject” (Grossman, 1990, p. 8). The final component included in this knowledge area is ‘knowledge of instructional strategies and representations for teaching particular topics’. Grossman (1990) described this last component by stating that experienced teachers have developed a large bank of metaphors, activities, experiments, or explanations that they have found quite useful when teaching a particular topic. There are data available for all four components.

Pedagogical Content Knowledge: Conceptions of the Purposes for Teaching Subject Matter

For this case, knowledge related to the conceptions of the goals for teaching specific subject matter would include those goals Jaimie held for teaching team handball to middle school students. When trying to discuss what Jaimie’s main goals or purposes
were for the team handball unit, it was difficult to get a clear answer. The question was either not answered, or when answered, the answer changed or the line of thought was difficult to follow. For example, the question was asked a number of times during the initial interview and the answers received included,

We would have to work on and focus on the creation of space and communication. We still have to work on the throwing because you can’t just throw it really. You have to be able to aim and get it to your partner or teammate. But creating space is going to be the biggest element that they’re going to need the most work on (initial interview, p. 5).

Jaimie was asked if she could be more specific. She stated,

But skill wise, we want them to be able to work together and that goes back to the cooperation and that would be that they can work together to pass the ball and they can catch the ball and they can communicate with one another. Communication is important because you can’t move the ball unless you communicate and work defensively and offensively together as a team and that goes back to the teamwork part (initial interview, p. 6).

When asked again if she could be more specific she replied,

Well, my weak background, it seems like the most important skill would be passing and catching and that calls for the communication part again. So, I think they’ll be more intertwined because you can’t catch it unless you communicate without saying, ‘Pass it to me’ or ‘I’m, open’ or ‘Drop the ball’, or ‘Square pass’. So I mean that’s part of the knowledge of the game, that terminology, like square would mean side-by-side, and drop would be behind, and give and go. Also that they can call plays, which is almost like a strategy (initial interview, p. 7).

Later still, she commented, I just want them to play. That’s one of my goals, that everyone will understand things and play (initial interview, p. 12).

The question was asked repeatedly throughout the team handball unit and her responses included, “teamwork” (post lesson interview, May 4, p. 1), and “using support and working as a team” (May 5, p. 1). When asked how they would use support in team handball, she stated, “Well the support issue in team handball, I’m not sure. You have to
move side to side and you can only pass it forward. I don’t know” (post lesson interview, May 5, p. 1). She suggested that teamwork was addressed in that “for team handball, one thing is that they’re using the ball and they’re working as a team” (May 5, p. 1). After some further probes, Jaimie later stated, “it’s not about the skills. It’s more about using teamwork and working as a team and moving, support, and passing. So that’s what we’re trying to get them to do in team handball” (May 5, p. 2). On the last day of the unit, she stated that her overall goals for the unit included “teamwork and communication” (post lesson interview, May 7, p. 9).

In attempting to summarize her goals for the unit by listing the goals mentioned, it appears the goals included: working together or teamwork, mentioned six times; communication and throwing and catching, each mentioned four times; using support, mentioned twice; and the creation of space, terminology, strategy, and playing the game, all mentioned once. Using Placek, Dodds, Doolittle, Portman, Ratliffe, and Pinkham’s (1995) categories that describe the purposes of physical education, it appears that the ‘social interaction/personal development’ category, the ‘learn skills and activities’ category and the ‘participation’ and ‘cognitive knowledge’ categories describe Jaimie’s purposes for teaching team handball. However, in reviewing the video-tapes of classes and researcher field notes, there is no evidence to suggest Jaimie taught terminology, nor did she specifically teach throwing or catching skills. Students did participate in a few drills and played a modified game at the end of each class.
Pedagogical Content Knowledge: Knowledge of Student Understanding

During the initial interview, Jaimie was asked what she thought her students already knew about team handball. She stated, “well I’m assuming that 6th grade to 8th grade would know how to do an underhand throw and catch and that’s how you move the ball is by throwing and catching (initial interview, p. 5). She later commented,

As a majority, I think they know it’s sort of similar to a field sport, for example, passing which is similar to football, and getting open which is similar to football and soccer. [They do not know] all the strategies but they know that it has something to do with having to score. They know they’ve got to get away from the opponent, they know they have to make space to get open for someone else to receive the ball or for someone else to make a run. So I make the assumption that they do understand you got to get open to get the ball. Sometimes they all don’t understand that but I think the majority are going to understand that (Initial interview, p. 12).

The source of this information came from the fact that, “soccer at our school is really popular. They were first in the city league, so I’m thinking that because of the history of the soccer program, that basically they will understand the basics of an invasion game” (initial interview, p. 12).

Jaimie did not seem to see this information as useful because when asked if she kept this information in mind when she planned her unit, she responded by saying, “No I didn’t. We just thought about some drills, well drills that would hit on how do you move the ball, like creating space type games, like the triangle game...” (initial interview, p. 13). According to Jaimie, what she did think about when she was planning the unit was “30 minutes. I have to fill 30 minutes” (initial interview, p. 13).

The pedagogical content knowledge Jaimie possessed was the result of assuming students would make the connection between soccer and team handball. Although Jaimie
made this assumption, it appears she considered the information irrelevant as she disregarded it when planning.

Pedagogical Content Knowledge: Curricular Knowledge

Included in the ‘curricular knowledge’ component is knowing about appropriate content and progressions. During my first observation of a team handball lesson, I noticed that Jaimie’s lesson plan listed grades 6, 7, and 8 on the top of the lesson plan. I asked if she was planning on doing the same thing for all three grades and she said yes. I proceeded to ask her if she thought there was a general difference in the abilities of each grade to which she responded yes. I then asked her if she was to teach math to grade 6’s would she repeat the same lesson to grade’s 7 and 8’s. She stated that would be inappropriate. So I then asked her why she would do something similar with her team handball lesson. She was silent for a moment, then said, “I see what you are saying” (post lesson interview, May 3). After a minute she clarified by explaining that she expected the grade 6’s to be able to do the drill a couple of times, the 7’s one or two more times and the grade 8’s would complete the drills more times and more quickly and would get more game time so that in effect, they were doing different lessons. In reality, it was still the same lesson. Each lesson plan that was written was done similarly, that is, the same lesson plan for all three grades.

Following the unit, I attempted to gain some information about this type of knowledge by asking Jaimie what types of things she would do differently if she had to re-teach the unit, what she would do if she had an extra 15 minutes added to each class, and what she would do if she had to teach the same groups of students the following year.
On the final day of the team handball unit, Jaimie was asked what she would do differently if she had to re-teach the unit. She commented,

I would definitely do the same drills that we did. Next time, I would probably use more of the actual team handball skills, like throwing it into a goal. That would be the only thing I would do. Maybe some of the markings on the floor, like the dome (i.e., the shooting circle) (post lesson interview, May 7, p. 9).

The same question was asked at a later date and Jaimie responded by saying,

I would start with more skill stuff. Like you mentioned previously, I would work on possession and possession games. I would include more build up activities that would help them think of strategies they could use when they were double teamed, for example how they could break out of that particular situation and what they could do to put pressure on the defense. I would try to cover more game-like situations so they would know what to do during the games. I would also try to make it more difficult by using a smaller goal instead of using the entire width of the field as the goal line. That way the students would have to think of offensive moves to move the ball down to that small target as opposed to the whole line. If I had more time, I would definitely try to teach more skills, similar to if I was teaching an intramural sports team (post lesson interview, May 17, p. 12).

When asked what specific skills or strategies she would teach she responded by saying she would have to think about it.

Jaimie was later asked what she would do with her unit if she had an extra 15 minutes for each class. She commented,

I would have had more game time definitely. For the classes that under-stood, I would have added more elements to the game. For example, you have to have so many passes, at least one drop pass, before you could score. I’d do this so they would not just move forward but they could see how back support would be useful (post lesson interview, May 7, p. 11).

Jaimie was asked to pretend that she was the permanent teacher and that the following year, she had to teach team handball to the same group of students. Reminding
her that her students already had her the previous year, she was asked what she would do with her unit the following year. She responded with,

I wouldn’t do the first passing game. I’d start with the support game and from there we’d move onto more of the game. Once we got into the game, then I would have the kids come up with their own strategy. For example, I’d ask them how they could move the ball if they were coming out of the back to the front. I’d have them draw out a strategy for me and them have them use the strategy because I can’t make them go faster. I’m just hoping that the more and more they practice the faster they will get. And for the 8th graders, I’d give them more rules that they had to follow when they were playing. For the 7th graders, I’d pretty much have them pick up where the 8th graders left off from this year and include more game play stuff. It wouldn’t be as in-depth strategy, but I’d have them use more passes and move quickly. I’m hoping from there they get faster and faster and when they get to 8th grade they’d understand the strategy cause then they’d know how to move fast and if they wanted to pass what would be the quickest pass, where should people be, why should they be there, some different ways to score a goal, and how you could trick the defense (post lesson interview, May 7, p. 11).

When asked if she could be more specific about what strategies and skills she was referring to, she stated that was the student’s task – to figure out how to move the ball more efficiently and where they should move on the court.

I did asked Jaimie where she came up with the idea of more skills and strategies and becoming faster, she stated,

When Enricki was here, he showed us there’s a defense called this, and there are two ways you can get a penalty, and you could shot this way and they would actually practice their shooting, and then practice shooting with a defensive player on them so they would have to use different shots (post lesson interview, May 17, p. 12).

Enricki was a graduate student that had extensive knowledge and experience with team handball. I had arranged for him to visit one of Jaimie’s classes as a guest speaker. Talking with Enricki following his visit, he stated that during his visit he described the game of team handball and told them that when you watch high-level players play, the
game is very fast paced. He said he pointed out a number of game situations that regularly occur and how to get out of them. When asked for an example he described the use of passing back to a player when two opponents were guarding you. He stated he pointed out a few ways to move the ball up the court, for example by passing and dribbling, and then proceeded to discuss and demonstrate the use of the shooting circle and various ways one shoots on goal. He said he tried to use as many game situations as possible when describing different shots and different passes. I asked him he focused on speed in the game and he stated that when you watched good players they were very fast and that to be effective you had to move fast or move the ball up the court quickly.

Following the team handball unit, I mentioned to Jaimie that I noticed she attempted to complete the same lessons regardless of the number of classes each group of students attended weekly. That is, Jaimie planned and delivered the same set of lessons the both the music and non-music students. When asked about this she stated,

> What we do for our three-day a week classes is we play games. We try not to add any more skills and drills for that third day. We may have a quick review, but then we let them play. The three day a week classes will just get more game time than the Tuesday/Thursday classes (post lesson interview, May 17, p. 15).

Throughout the unit, Jaimie planned and delivered the same lesson to three different grades and to students that attended either three days a week or two days a week. Following a visit from an experienced team handball player, it appears that Jaimie was aware that there were a number of skills and strategies necessary to play team handball and if she had to teach the unit over again, this content should be included. Although Jaimie was aware that the game was more complicated than first thought, she was unable to articulate some specific strategies or skills.
Pedagogical Content Knowledge: Knowledge of Instructional Strategies and Representations

A big source of instructional knowledge, in relation to improving instructions and demonstrations was observing the students. In a discussion about how she felt about her explanations and demonstrations Jaimie stated that initially, “I don’t think we were clear enough sometimes” (post lesson interview, May 6, p. 3). However, after watching students carry out the drills and activities incorrectly, she realized that she couldn’t make assumptions regarding what students would pick up from her demonstrations and that she had to be clearer. As she noted,

You don’t think you have to mention things, but then they’ll start throwing [the ball] over top [of the defensive player]. After that happened I would say, ‘You can’t throw [the ball] over top, you can only use the sides because that’s [the top] not really a support position. Then you have to explain why it’s not really a support position, because it’s an open ball when you do that. So they’ll come up with things and you think, I didn’t tell them that and we’ll stop them and then tell them [the next class] the next time (post lesson interview, May 6, p. 3).

After observing a lesson from Thursday’s classes, I asked Jaimie if she noticed any differences between Thursday’s classes and Wednesday’s classes as the same lesson was taught both days to different classes. Without hesitation she stated,

Well, the instructions were a lot clearer than they were yesterday. I broke it down a little bit further. For example, I tried to explain why they needed to have the support person on the left and the right and why they could not pass [the ball] overtop when they’re on offense. I had to go back and explain why they had to have someone on the ball at all times which is something I didn’t do yesterday (post lesson interview, May 6, p. 5).

When asked why she didn’t explain the drills as clearly the day before, she stated, I really didn’t think about it yesterday” (post lesson interview, May 6, p. 5). It wasn’t until she saw a large majority of her students “just standing around” (post lesson
interview, May 6, p. 5) that she realized “they never really figured that part out either
about you could just go to where the open pass is” (post lesson interview, May 6, p. 5).
Jaimie realized she had to more fully explain the drills and did so by putting more
information into her explanations and demonstrations.

R.Q.2. What Are the Enacted Effects of Knowledge Acquisition on the Student
Teacher and/or Students When Teaching Content Perceived to be Unfamiliar?

There were three notable effects on students when Jaimie was teaching content
she perceived as unfamiliar. First, Jaimie lacked a clear focus regarding the purposes for
teaching team handball and as a result, it appears that she presented a limited number of
drills and activities as opposed to actually teaching specific team handball related skills
or strategies. Secondly, and likely related to the first, is that Jaimie did not plan
developmentally appropriate lessons. Rather, she planned and delivered the same lesson
to all students regardless of their grade, or previous experience. Finally, when she was
unfamiliar with the content, her explanations tended to be long, drawn out, and often
confusing.

Lack of Clear Focus

Jaimie was unable to clearly articulate what her goals for the team handball unit
were. A clear conception about the goals for teaching particular content to students
provides “a template for teachers’ decision making about what to teach, … and what to
emphasize within a course” (Grossman, 1990, p. 210). It was previously pointed out that
Jaimie listed a number of different goals for her team handball unit over the course of a
number of different conversations. The lack of a clear focus resulted in Jaimie
conducting a number of drills or activities as opposed to actually teaching students the
game of team handball. That is, she never broke down any team handball specific skills,
nor did she teach the students how to perform any team handball specific skills or rules.
Rather she presented students with a series of activities. For example, during the first
class, students practiced throwing a ball in a circle, calling out the name of the person
they were throwing to and after a specified period of time, she added more balls. After
that, the students practiced throwing the ball to a teammate as the pair traveled the length
of the gym. During these activities, Jaimie simply demonstrated what she wanted done
or how the activity was to be carried out. She did not indicate how throwing was similar
or different in team handball than other sports, nor did she discuss or point out the rules
surrounding throwing and catching in team handball (researcher field notes, May 3,
1999). This was done, despite the fact that she stated she assumed her students knew
how to throw and catch a ball. During one class, Jaimie did try to present the concept of
support. Here, Jaimie introduced a drill where students were required to move into a
support position to catch the ball when one’s teammate was being guarded. With this
activity, students were shown how to complete the drill, that is, they were told, if person
A has the ball, person B must move to a certain position so the person with the ball would
have someone to pass to. Jaimie did not highlight the purpose of the drill or how the drill
would be useful when playing a game. Rather, she presented the drill as simply a drill for
students to practice. No connections were made that explained or pointed out how the
drill or concept the drill was trying to highlight were used in the game of team handball
or other invasion type games. The result was that Jaimie’s team handball lessons
consisted of a limited number of drills that she and her teaching partner remembered participating in as athletes or students in other similar type activities. Connections from drill to drill and class to class, and connections regarding how the drills were related to the game of team handball, were noticeably absent.

**Developmentally Inappropriate Lessons**

Another effect of teaching unfamiliar content to students was the inability to plan lessons that were appropriate to the students’ ability levels. This was evident in the fact that the same lesson was planned and used for grades 6, 7, and 8. According to Jaimie’s cooperating teachers, they had taught team handball in the past. Thus, the 7th and 8th graders had previous experience with the sport of team handball. On the last day of the team handball unit while I was waiting for Jaimie to finish with a group of students, I talked to her cooperating teachers about the unit Jaimie had just taught. I asked them if they presented their team handball unit in a manner that was similar to the unit Jaimie had taught. They responded by saying that they taught more actual team handball skills and rules. When I asked them what they thought of the unit and lessons Jaimie and Brett had just taught, they stated that teaching the same lesson to all three grades was inappropriate as the lesson would be appropriate for one grade and would be either too easy or too difficult for the other grades. They pointed to the lesson we had been observing as evidence. The eighth grade class we were observing was supposed to be playing a game of team handball, and providing support for their teammates as a way to move the ball up the court to get into a position to score. However, there was more arguing occurring amongst and between teams then passing and running into open spaces. Jaimie was
spending the majority of her time mediating the arguments and trying to get the four teams back on task. The female cooperating teacher stated the reason she was having so much difficulty was because the students were bored with the game. First, she stated the game was too easy for them, and secondly, it was the same game they had played for the last two classes. Following the day’s lessons, I asked Jaimie if she felt the problems with the 8th grade students could have been avoided if she had changed the game and made it more difficult or easier. She responded by saying,

I don’t know. That class makes me feel like I should have just let them play. Sometimes I feel like why try? If I add more stuff to it is it really going to effect their motivation or is it going to make it worse for me or am I going to feel like ‘oh they just don’t understand”? They’re not even into it. What do I do with this class? (post lesson interview, May 7, p. 11).

Jaimie knew something was wrong with her lesson as she stated, “They’re getting bored with this I can tell, because they’re not as excited as they were” (post lesson interview, May 7, p.12) but she did not know what to do about it. Her solution was, “I just try to get through the lesson and try to think that as long as they start to play, just try to get through” (post lesson interview, May 7, p.12).

Lengthy Explanations

Although her explanations improved over the course of the unit, initially, they were quite lengthy and Jaimie knew it. When Jaimie was teaching content she perceived as unfamiliar, she often presented long, drawn out, confusing explanations for students. During a discussion that started with the number of activities planned in each team handball lesson, Jaimie stated, “We had just enough planned for team handball” (post
She further explained that the reason she didn’t over plan for her team handball lessons was

We would have long drawn out explanations because we were trying to explain it clearly for ourselves so that we could understand it and then explain it to them. That is why it was taking us longer to get through this stuff and why we only had one activity planned and then the game at the end (post lesson interview, May 26, p. 8).

During a video recall session, Jaimie was shown a clip from a previous class. In the clip, she had just provided an explanation and demonstration and sent the students off to practice. In the video clip she was moving from one group to another group and began to interact with the second group of students. I asked her to explain what was going on and she stated,

This is where we’re getting into the four-corner game. It looks like what I’m doing is, … and another thing that happened was that the cones were set up in a grid and they didn’t know which grid they were supposed to be playing on. They thought there was a grid in the middle but it really wasn’t a grid it was a safety zone in the middle. So I was going around and explaining which grid belonged to each group, and that you need three people on offense and two defenders, and reminded them about the support player. Almost every group I went to I had to tell them that, and then I had to go into telling them that they had to switch with people (video recall session, May 7, p. 5).

Jaimie was aware that her explanations were often lengthy and unclear in team handball as she stated,

Once they got started, I had to go back and re-explain certain drills because they’ll just stand there, “where do we go, how do we move?” So I had to go back and tell every single group how to get started, had to re-explain, “ok, if you’re here, you need two people to throw the ball to, etc.”, and that took up a lot of time as far as getting them started and getting them going (post lesson interview, May 26, p. 3).

Having to re-explain to each group individually occurred after a lengthy demonstration with explanation was previously provided.
R.Q.3. During a Secondary Physical Education Teaching Internship, What are the Types, Sources, and Perceived Relevance of Knowledge Acquisition When Teaching Content Perceived to be Familiar?

Subject Matter Knowledge

The general area titled subject matter knowledge includes three components. These are content knowledge, and knowledge about the syntactic structures and substantive structures of the discipline. Content knowledge refers to “knowledge of the major facts and concepts within a field and the relationships among them” (Grossman, 1990, p. 6). The substantive structures within a discipline are the “various paradigms within a field that affect both how the field is organized and the questions that guide further inquiry” (Grossman, 1990, p. 6). Syntactic structures in a discipline refer to “how knowledge claims are evaluated by members of the discipline” (Grossman, 1990, p. 6). After analyzing these data, content knowledge and substantive structures are the two components for which Jaimie sought knowledge in the subject matter knowledge area. Throughout the duration of this study, Jaimie provided no evidence that she sought or received knowledge relative to syntactic structures.

Subject Matter Knowledge: Content Knowledge

As previously discussed, Jaimie did have previous knowledge and experience with track and field. She had taken a university track and field activity class, she was a member of the track and field team while a middle school student, she regularly enjoyed watching track and field activities on television, and her dad was a track and field coach so conversations that related to track and field were not uncommon in her house.
Even though Jaimie did have prior knowledge and experience with track and field, she still sought additional information about the content of track and field. To prepare for track and field, Jaimie stated,

Actually I have more books for track and field than I did for team handball since there are more events. So Brett and I both went out together and got books. I’ve just been looking through books and a lot of other students in the class are teaching track and field so we talk with them (initial interview, p. 4).

In the track and field unit, when searching for content knowledge, instead of looking for content about the basic skills, mechanics of the skills and rules of the activity, she was searching for new drills and activities that the students would find easy and understandable and that would help her plan appropriate progressions. When discussing the use and relevance of the track and field books she had acquired, she stated,

With track and field, I had a lot of stuff (handouts) from classes but I wanted to see if I could find new ideas, like for sprinting. What are some different drills that they do for sprinting or what do they do for hurdles? What are some different things that I could use? I already knew what it should be, so I looked through the books to see how they would set [the drills] up and how [the drills] would work. I was also looking for short, quick, good drills that [the students] could use in the track and field unit that would make it easy - that I understood and that the kids would understand without having to go into a long explanation (post lesson interview, May 26, p. 10).

She reiterated this during the final interview when she stated,

For track and field I did look in other books besides my stuff from YZU (course packets and handouts) and I was looking for different things. I was looking for the progressions from what I already knew. I knew I could use one drill from this (handouts she had collected from different classes) but what else could I do that would be fun? Also, [I wanted to] get new ideas that would help build on [the activities I already had]. I was definitely looking for the progressions and content. …I got a lot of the track and field information from the handouts Mulligan gave us. I also took a whole class (a track and field activity class) that covered every event so I had that experience. Dr. M’s and Ellen’s [the track and field instructor] handouts were pretty similar and I wanted to find other [ideas] so I looked in a couple of books. One was [a book] from Dr. Underhill’s class that
was a successful coaching book and it was mostly based on track stuff [content]. I used two books from the YZU library and I got a lot of information from those as far as drills and skills (final interview, p.3).

As well as using “the packet that Dr. Mulligan gave us” she also used the packet that I got from track and field when I took that class and then two books that I got from the library” (post lesson interview, May 17, p. 20). These three sources allowed her to “pick out some really simple drills that the kids could do and understand and it put [lesson and unit plans] together” (post lesson interview, May 17, p. 20). References listed on the reference page of her track and field unit plan support Jaimie’s verbal statements.

Although she considered herself familiar with the content of track and field Jaimie consulted books and previously acquired class material for additional suggestions that would supplement the knowledge she had. The material she acquired and consulted was relevant as she was able to pick and choose from her acquired references, different activities she thought were appropriate for her students.

Subject Matter Knowledge: Substantive Structures

When Jaimie taught track and field it would appear from the information gathered in the content knowledge section above and the general pedagogical and pedagogical content knowledge categories below, that Jaimie had adopted a combination of the academic and technological orientations. Rink (1993) described the emphasis of the academic orientation in physical education as focused on “games, sports, dance and fitness” (p. 15), and the emphasis on the technological orientation in physical education as focused on “…research based teaching skill development”(p. 315). Jaimie taught the
sport of track and field and searched for a number of different activities that would assist her in delivering effective lessons that the students would enjoy. Observations of her classes indicate that she did teach the skills required to participate in the event she was teaching. Conversations indicated that she was cognizant of the importance of quick transitions and keeping students active. As well, she mentioned the usefulness of her university supervisor when the supervisor coded various teaching behaviors, such as the amount of time students spent engaged in activity.

It appears that this information was gathered as a result of course work and previous teaching experiences. Course work, specifically a secondary methods class, provided Jaimie with knowledge about how to break down and present content. As discussed in the team handball section, Jaimie’s experience teaching in an elementary setting the previous quarter where her cooperating teacher regularly coded and provided feedback on various teaching behaviors, like Academic Learning Time, feedback, and movement, reinforced messages she had learnt in methods courses. Similar coding and discussions with her university supervisor further reinforced the importance of implementing various teaching strategies. This information was obviously relevant to Jaimie as she worked to consciously incorporate the pedagogical practices in her daily classes.
General Pedagogical Knowledge

General pedagogical knowledge is another area of knowledge found in Grossman’s (1990) model of teacher knowledge. This knowledge area “includes a body of general knowledge, beliefs, and skills related to teaching” (Grossman, 1990, p. 6). This knowledge area contains four components, namely, the individual’s knowledge and beliefs about learning and learners; knowledge of general principles of instruction; knowledge and skills related to classroom management; and knowledge and beliefs about the aims and purposes of education. Classroom management and curriculum and instruction are the two components that will be discussed from this knowledge area. No evidence is available to support how Jaimie sought or received knowledge about learners and learning, or the conceptions of the purposes of teaching subject matter.

General Pedagogical Knowledge: Classroom Management

The classroom management component includes such practices as establishing a routine and outlining the rules that will govern how the class is run. Other tasks such as entering the gym, taking roll, transitioning, organizing for instruction, regrouping, getting equipment out and away, staying on task, obeying rules for behavior and class closure are examples of frequently recurring managerial tasks in physical education (Siedentop & Tannehill, 2000).

As previously discussed in the team handball section, Jaimie learned the rules and routines the cooperating teachers had implemented prior to her arrival. She used the established rules and routines for her team handball unit. Finding success with the
procedures, and beginning to feel comfortable with them herself, she continued to use
the same routines and enforce the same rules during her track and field unit.

Jaimie’s teaching partner acted as source of pedagogical knowledge related
classroom management. Throughout the day, they would take turns teaching the classes.
In between every class, Jaimie and Brett were seen talking to each other. I asked her
what they talked about between classes and she stated that they would discuss the lesson
just taught to see if improvements could be made. According to Jaimie, discussions often
centered around,

What’s working. What could you do differently to help you out? The first period
class didn’t go well. We had problems with the transitions from the hurdles to the
sprints so we talked about what we could do to make [the transitions] better.
We’ll ask each other questions that our cooperating teachers are supposed to ask
us. That’s how we figure out what and how we’re going to change things and try
something else (post lesson interview, May 24, p. 2).

When asked if she could be more specific about the types of things she and her
partner were talking about or learning from each other, she stated,

It’s more organization. I think the actual teaching of the lesson goes fairly well.
Sometimes we just lose time in transition and it messes up everything. For
example, for the first couple of classes, we didn’t take the trainers out while
everyone else was doing [the warm-up]. Initially, we had everyone warm up and
then we took the trainers out. While we were working with the trainers (showing
them how to use the time sheets) the team captains were supposed to get [their
teams] organized. It was taking a lot longer than we thought. We had a lot of
people standing around. So this time we took [the trainers] out while everyone
else was doing running drills. We didn’t do that first period (post lesson
interview, May 24, p. 2).

One other source of knowledge relative to classroom management came from a
student in the class. At one point, Jaimie was struggling with organization. She was
trying to put students into groups for practice drills. During one class (May 19), her
instructions were “everybody get behind the line in rows” (videotape, May 19). The following day, she asked her team captains to stand on an X placed on an end line and then told the remaining students to fill in behind their team captain. When asked why she made the change she stated,

Because (yesterday) I was not coming through. I was having the worst time. Plus, I was losing the concept of teams when I just asked them to line up in rows and not their team. So I said, ‘Ok, the easiest way to do this is to put the team captains up front and then have the teams line up in a line behind them’. That way, they will all be in rows” (post lesson interview, May 20, p. 4).

When asked where this idea came from, she stated,

Actually, a student said something to me. He said, are we going to be in our teams today for track and field?’ and I said, ‘oh, you are now’. I realized that it was going to make it easier for me to explain the drill because I was really struggling with that part of the lesson (post lesson interview, May 20, p. 4).

The general pedagogical knowledge related to classroom management Jaimie received included information that would help decrease transition time providing less time for students to become disengaged, and ideas about how to better organize students for instruction. The source of this information came from her teaching partner, and a student. Jaimie felt the information she received from all sources was relevant.

*General Pedagogical Knowledge: Curriculum and Instruction*

Specific curriculum and instruction knowledge Jaimie received included information relative to students’ academic learning time. Also, it was during this unit that Jaimie was able to implement previously acquired general pedagogical knowledge about providing short and clear explanations.

During one observation (May 19), the university supervisor used an ‘academic learning time in physical education coding sheet’ to examine how much time students...
were actively engaged with the content. Jaimie was aware of the importance of student time on task as an indication of student learning and was disappointed when told the students coded were active for 30% of the time and wondered what she could do to improve. According to Jaimie, her university supervisor stated “When you’re doing certain units or certain stations like track and field, your activity time for all your students is not going to be very high because you’re going to have to take your time doing certain things” (final interview, p. 7). According to Jaimie, her university supervisor continued by telling her,

Don’t feel bad because when you are doing the softball throw or standing long jump, activity time was about 30% and that’s something you just can’t get around. That was a good percentage considering the students had to complete the activity one at a time to make sure that accurate numbers were recorded (final interview, p. 7).

Jaimie stated she found this information to be relevant because it reinforced to her that the manner in which she was instructing her class and the activities she was presenting, were appropriate.

When asked if she felt that the information her university supervisor provided over the course of her unit was useful, Jaimie responded with,

Yeah, cause we could sit here and look at the coding sheets and that was something that we didn’t have all the time. We only had it when she was here. So when she would code us on our feedback or code us on the ALT sheets, we would sit down and look at it and it would help us, like ok, so now we know, maybe next time we do this lesson or do something similar to this, that we should rearrange it so that maybe this would be different, like transitions would be lower or different ways to manage. That way we could look back on the lesson and she would have her notes and tell us like what would happen during the lesson so we can go back and look. So, it was really relevant because we didn’t have it all the time and when we did have it we would use it and look back on some of the things and some of the things she said and her comments before we would plan for our next lesson (final interview, p. 8).
Course work provided Jaimie with some other classroom management information that would enable her to conduct effective lessons if such knowledge was demonstrated. During a discussion following one of her lessons, Jaimie described the class as successful and proceeded to state that one of the reasons the class was successful was because she used short explanations. Jaimie stated she knew this during her last unit but just couldn’t pull it off. However, during her track and field unit, the result of providing short explanations was that students were “doing the drills, and when they were doing the drills they were doing them like they were supposed to” (post lesson interview, May 20, p. 1). When asked where she came up with the idea to keep explanations short, she responded by saying, “just from other classes, methods classes, that I’ve had – the shorter directions with students and clear directions, makes it easier for them to understand” (post lesson interview, May 20, p. 1).

Having her university supervisor code student behaviors provided Jaimie with a relevant source of knowledge. The information and the comments the university supervisor supplied provided Jaimie with another view of her classes and helped reinforce that what she was doing in her classes, was good. Also, Jaimie felt that by incorporating the suggestion from a previous methods class to keep explanations short and concise helped students understand and complete the task as intended.

**Pedagogical Content Knowledge**

Grossman (1990) uses Shulman’s (1986) definition of pedagogical content knowledge and stated this knowledge category includes,
the most regularly taught topics in one’s subject area, the most useful forms of representation of those ideas, the most powerful analogies, illustrations, examples, explanations, and demonstrations - in a word, ways of representing and formulating the subject that make it comprehensible to others. Pedagogical content knowledge also includes an understanding of what makes the learning of specific topics easy or difficult; the conceptions and preconceptions that students of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons (pp. 9-10).

Grossman includes four components in this area of knowledge. The first is knowledge and beliefs about the purposes for teaching a subject at different grade levels, which are “reflected in teachers’ goals for teaching particular subject matter” (Grossman, 1990, p. 8). Knowledge of students’ understanding, conceptions, and misconceptions of particular topics in a subject matter is the second component of pedagogical content knowledge. According to Grossman (1990), in order for teachers to generate appropriate explanations and representations, “teachers must have some knowledge about what students already know about a topic and what they are likely to find puzzling” (p. 8). Curricular knowledge is the third component included in this knowledge area and “includes knowledge of curriculum materials available for teaching particular subject matter, as well as knowledge about both the horizontal and vertical curricula for a subject” (Grossman, 1990, p. 8). The final component included in this knowledge area is knowledge of instructional strategies and representations for teaching particular topics. Grossman (1990) described this last component by stating that experienced teachers have developed a large bank of metaphors, activities, experiments, or explanations that they have found quite useful when teaching a particular topic. After analyzing data gathered for this study, information to address three of the four components were available: conceptions of the purposes for teaching subject matter, knowledge of student...
understanding, and knowledge of instructional strategies. Jaimie did not provide any data related to knowledge of curriculum materials available for teaching particular subject matter.

**Pedagogical Content Knowledge: Conceptions of the Purposes for Teaching Subject Matter**

This component of pedagogical content knowledge includes “knowledge and beliefs about the purposes for teaching a subject at different grade levels” which are “reflected in teachers’ goals for teaching particular subject matter” (Grossman, 19990, p. 8). When asked specifically what her goals were for the upcoming unit, Jaimie responded by saying,

Hurdles, standing long jump, softball throw – that’s where we’re really going to look at the critical elements of the actual skill because it takes the critical elements to be able to do the skills well. The sprinting is going to be hard. The only thing I think I can look at is their starts. For example if it’s a long sprint, what do they do? Do they have a game plan for the sprint or are they going to try to sprint the whole way around. …If they’re running a 400, they have to know how to pace themselves. We’re going to look at the critical elements of the softball throw. That would be the approach, their arm back, and their release point. For the standing long jump their arm swing, their bend, and their pull up would be important (initial interview, p. 8).

Here it appears that Jaimie is concerned with what Placek et. al., (1995) described as “learning skills and activities” (p. 348) which refered to students’ developing and or improving their ability to perform physical activities and motor skills.

**Pedagogical Content Knowledge: Knowledge of Student Understanding**

Jaimie was asked what she thought her students already knew about track and field. She believed that some of her students held preconceived notions about the activity and also noted a potential lack of understanding when it came to longer running events. More specifically,
Running I think is their preconceived idea of track and field - sprints, the mile, and a few field events. I don’t think they’ve really thought about ‘How can I run a fast mile or how can I run through a 400 without getting tired and still get a good time?’ All they know is run fast; no elements of actual strategy and how [that strategy] can be used to get a good time or how to better run over the hurdles instead of jumping over them (initial interview, p. 14).

The source of the information about prior student understanding came from Jaimie’s past experiences with track and field as a student herself, and from the students she was teaching. As a track and field athlete herself, Jaimie explained how she remembered students at track practices just wanting to run as fast as they could all the time, and always complaining about having to do the distance work, the stretching, and the technique drills. When students would ask Jaimie about upcoming units and were told they would be doing track and field, students often responded with comments such as “I hate running” or “I like running”.

Jaimie found this information relevant as she took it into account when planning her unit and lessons. More specifically, Jaimie has planned to ‘hide’ some of her teaching through the use of warm-up stations, and also planned to include events other than running, into the unit. She also planned to provide instruction, in the form of feedback during longer running events, that would encourage students to pace themselves so that they could run the entire distance, rather than running full out at the beginning of the run and finishing the run by walking.

Pedagogical Content Knowledge: Knowledge of Instructional Strategies

One of Jaimie’s main sources of pedagogical content knowledge for teaching track and field came from her secondary methods course and more specifically, from the course instructor. According to Jaimie, during this class,
we did things that would help us teach a variety of activities, for example, we had three gymnastics meetings where she (the course instructor) taught us how we would teach gymnastics as a beginning teacher, or how you would teach track and field as a beginning teacher (post lesson interview, May 17, p. 19).

The experiences gained and activities she participated in during her secondary methods class helped Jaimie break down skills into component parts. Jaimie started her track and field unit with the sprint. More specifically, she had broken the sprint up into five parts and arranged the gymnasium into five stations. At each station, she had a drawing of a stick person executing the movement with the movement labeled. After demonstrating what was expected at each station, the students were to practice each station activity until told to rotate. In describing her stations, she stated,

The stations were all parts of the sprint. I had high knees. I had marching high knees. I had arm action over there on the mats. I had butt kicks over there, and I had drum major, which is like high knees. They were supposed to go through each station for three minutes and then the last 11 minutes I was going to have them run sprints in flights (post lesson interview, May 17, p. 2).

The skill break down came from the activities she had participated in during her secondary methods class. She stated,

Dr. Mulligan showed us all these things that would help with your sprinting. We thought we would use those drills and put them in stations. Then we would let them (the students) run sprints at the end of the class so they could re-visit everything that we went through in our stations (post lesson interview, May 17, p. 2).

This was relevant information for Jaimie as she stated, “That’s what we’re going to do for pretty much all of our running events” (post lesson interview, May 17, p. 2).

Throughout the unit, Jaimie repeatedly mentioned the work she did in secondary methods as a source of information. Each time she was asked specifically if she felt the
exercises and experiences she participated in during her methods classes were relevant.

She stated,

For the track and field lessons, I’m using a lot of the [activities] that we did with Dr. Mulligan to help with [the track and field unit]. We went through a lot of drills [in class] that showed us [how] to [teach] the lesson. We did the whole lesson and [the methods instructor] would show us all these things that would help with sprinting (post lesson interview, May 17, p. 19).

She again referred to the relevance of her prior experience with having covered the content in class when over a week later when discussing why she felt her track and field unit was going so well she stated, “. . . because I actually have experience with what we did with Dr. Mulligan in her class, what it should look like and the purpose of it, and how it’s going to help in the long run” (post lesson interview, May 26, p. 1).

During the final interview, she again referred to the exercises and experiences she participated in during her secondary methods class as a valuable source of knowledge. She stated,

[the course instructor] gave us a lot of content stuff [ideas on how to present different track and field content] that was really helpful. That was the majority of the information that she gave us. When we had her class during the quarter, everything was content and it was really helpful. It came through in track and field as I could see some of the ideas she was showing us and how we could teach [the content]. For example, how to do starts without starting blocks and different activities and drills that we could do [with the students] and how we could [teach] (our students). When [the course instructor] was teaching us, we were actually doing it, so we were like, “Ok, that’s how it works”. [By doing the activities ourselves] we knew whether it would be fun or if it worked or if it wouldn’t work. A lot of the content we learned in Dr. Mulligan’s class was really helpful (final interview, p. 9).

Prior to observing any classes, Jaimie was asked if there was anything she was worried about with respect to teaching track and field. She replied, “One thing I’m kinda
worried about is that they’re not going to listen or pay attention to the elements when we’re doing hurdles (initial interview, p. 14).

Her worry about students not listening to future track and field instructions was rooted in a previous experience at the same school trying to teach the students how to bat a ball off a tee. Trying to explain her worry about students not listening to instructions, she stated,

Some of the activities we have done, or games we have played, they don’t perform the skill [as taught]. They want to do it how they already know. For example, we did softball and hitting off a tee. I don’t know how many times that we showed the stance, how you hold your hands, and how you line up your body when hitting. Every single person that came up to bat, we had to show them [the correct way] and they still did it how they felt like doing it (initial interview, p. 15).

Jaimie felt this information was relevant as she had thought through how this information could possibly affect her track and field unit and had planned, with the help of information attained through her secondary methods instructor, a way she thought would help her overcome the problem. According to Jaimie,

When we get to certain events like the hurdles, we’ll put in certain stretches, like the hurdle stretch, to give students a warm-up. For each event or activity we’ve chosen five activities that we got from our work out with Dr. Mulligan that could help them understand automatically, just from practicing it in the warm-up and not realize that it will help them in their running or hurdling. ... We’re hoping to have them practice the stretches in their team warm-up without having them know it’s to help them right away. Then, when they actually run over the hurdles, the work done in the stretches will come through. So we’re secretly adding different elements, without really telling them until they start to do it. When they begin running the hurdles, we’ll say, ‘See how you did that, how you got that short step to help you get over and how, when you came down, you were able to go straight into your running again’. So we won’t tell them right away, because sometimes they say ‘that’s stupid’. We’re trying to hide certain elements that will help them. ... That’s the way we thought we could best attack it. They would accept it without knowing they were accepting it (initial interview, p. 15).
Jaimie’s secondary methods class served as a valuable source of pedagogical content knowledge as the instructor did not merely present generic ways of presenting content. Rather the instructor demonstrated for the pre-service teachers how they could present specific track and field content when teaching. Thus, the methods instructor provided the pre-service teachers with pedagogical content knowledge.

R.Q. 4. What are the Enacted Effects of Knowledge Acquisition on the Student Teacher and/or Students When Teaching Content Perceived to be Familiar?

Thinking on the Spot

When teaching familiar content, Jaimie was easily able to make adjustments to her lesson plans when the original lesson plan did not go as intended. For example, the first day of her track and field unit, her teaching partner was ill, and Jaimie was left to take over all the classes by herself. The lesson as originally planned “kinda got ugly” and she was “really frustrated that it didn’t work” (post lesson interview, Monday May 17, p. 2). She realized very early into the lesson that “doing stations is not going to work today, so I need to do something else” (post lesson interview, Monday May 17, p. 2). Jaimie had her lessons planned and initially did not want to deviate from them. But, when it was suggested by Brett’s cooperating teacher, Mr. Bedard, that Jaimie modify Wednesday’s lesson as a result of the problems encountered in Monday’s classes, she initially responded by saying “I don’t want to mess up the plan for the next couple of days” (post lesson interview, Monday May 17, p. 3). However, with the suggestion from Mr. Bedard that she combine sprinting with something else, like hurdles, she was able to instantly suggest possible modifications to Wednesday’s lesson. When asked after her
first class on Monday what she would do on Wednesday, she was able to come up with possible modifications on the spot. She responded by stating

I’ll probably have to drop off marching high knees and put another something there. I’ll definitely keep high knees, keep butt kicks, keep the arm action, and I’ll have to have two arm action stations because arm action when you’re jumping over the hurdles is different from when you’re just sprinting (post lesson interview, May 17, p. 3).

Despite getting off to a bad start, Jaimie mentioned that overall, she felt her track and field lessons were much more organized. When asked why she felt this way, she responded by saying, “I knew exactly how it was going to flow, what to put in [the lesson]. …it was more organized, everything was set up. I could see how it was going to work. I knew what order [activities were] to go in”(post lesson interview, May 20, p. 3). This enabled her to be able to ‘think on the spot’ and modify lessons from class to class. For example,

I had high knees marching and I took that one out because I did it with my first class and they were just walking, they weren’t really doing it. When I saw them completing the station incorrectly, I thought, “This is an opportunity. If I take this station out, then it won’t leave any opportunity to not do what they were supposed to be doing.” So I took that [station] out and then I reorganized [the stations] so that they started here and went this way. I then added the arm action, because on Monday, I knew that I was not going to finish hurdling and that was going to mess me up a little bit. So, I added [the arm action station] for the Tuesday and Thursday classes because I only have them twice. I’ll do something similar for the Wednesday and Friday classes so that when they come back they’ll all be starting on the same thing. So I took the [high knees marching station] out and then I tried to add it back into [the station rotation]. In doing so, it was almost like a little bit of a progression. For example, they have the high knees, the trail leg, then they do the arms, then they go into [their next stride]. When they’re doing that, you can see the arms and everything coming together at the end (post lesson interview, May 20, p. 3).

Further evidence of Jaimie’s ability to think on her feet and modify her lessons
was demonstrated the following week when a change in her lesson plan occurred. I had been present to observe the second class she taught for the day and noticed that on her lesson plan she stated that there would be a ‘high knees marching’ station. During the lesson, that station was absent and the ‘wall drive’ station, which was not on the lesson plan, was included. I asked Jaimie about the change and she responded by saying,

During the first period class, I didn’t have a very good experience with the high knees marching station. They were not into it and I was really frustrated and plus Mr. Fisher wasn’t here. I realized it was an opportunity where they could do nothing. They can just stand at the wall without having to do the high knees marching, and do walking instead. So I took that [station] out and added the wall drive. I thought, “I’m now adding another element of track and field besides sprinting and [I can] put in something [that more closely resembles] the hurdles”. It was a little like sprinting but it was getting them prepared for the hurdles. Since we had to do the physical fitness testing mile, we didn’t have all the time we needed or would have liked to have had for the rest of the unit (post lesson interview, May 26, p. 8).

The ability to modify existing lessons on the spot was again demonstrated when, five minutes before classes were to start, Jaimie’s cooperating teachers informed her and her teaching partner that they were going to have the students complete the post test of a fitness test that was first administered the previous fall. Initially she was furious for having been given such short notice about the change of plans and the fact that her cooperating teachers were taking days away from her unit. However, the end result was that,

We decided that we’ll just do the mile and use that time for their Olympic time. We said, “Ok, the top five finishers will get bonus points for their team and if you finish in under 10 minutes you’ll still get two points for your team and everybody else gets a point for doing it”. We knew we were not really going to have a lot of time to spend on hurdles so we put hurdles in with sprinting and that was our introduction to the hurdles. And the next time we have our stations, we are actually going to put the hurdles in there (post lesson interview, May 26, p. 9).
During a video recall session, Jaimie was shown a segment from a previous class where the class was performing a warm-up and they were running the length of the gym with knees up high. When they got to the end of the gym, she directed “butt kicks back” and the students were just about to comply when she said, “no, no, hold it, hold it” and decided to change the command to “high knees”. When asked why she made the changes she stated,

Because they were supposed to run down and come back around and then do it again. Since they all stopped and started lining up again (instead of running back along the sides of the gym to do it again), I said, “Ok, I’ll have them go back” and it gave him (Mr. Fisher) enough time outside to set up (set up field for the day’s activities) (May 26, p. 1).

Skill Breakdown

When teaching track and field content, Jaimie was able to break down the skills into component parts and present the parts to students. For example, she was able to break down running the hurdle into the approach, the jump, and the landing. Sprints were broken down into starts, the race, and the finish. Distance runs were broken down into the beginning, the middle, and the end. The skills were not only broken down for the students, but the parts of each skill were practiced individually then put together to practice the whole. Skill breakdown and practice was done through station work that occurred at the beginning of every class. During the station work, there was no attempt to individualize instruction or provide challenges for various ability levels. However, when the component parts of the skills were put back together and students were practicing the skill in its entirety, either in the form of a race or practice race, individualized challenges were offered. For example, when doing sprints, she
encouraged students to pair up with a classmate they felt was of the same ability level and when doing hurdles, students had the option of running over lower hurdles.

*Feeling Comfortable*

Near the end of the track and field unit, the researcher was talking to Jaimie about how it appeared that her unit was running more smoothly and how it appeared that she was much more comfortable teaching this unit. For example, she was more easily able to stop students in the middle of a drill and re-direct them or modify the drill if she thought there was a better way for students to execute the drill. When she stopped the drill, it appeared she knew what she wanted to say, and how she should go about making the changes. When transcribing field notes, the researcher noticed that she was able to talk more fluidly, that is, there were less incomplete sentences and thoughts and Jaimie didn’t stray when answering the question nearly as much during track and field discussions. When these points were presented to Jaimie, she suggested “I think it’s because I’m more comfortable with the students and the content” (post lesson interview, May 26, p. 1). She proceeded to explain that having had Dr. Mulligan (her secondary methods class instructor) go through how to present track and field content to secondary students made the teaching of the unit much easier as she had previous experience to draw from. Also, although she was comfortable with the content of track and field, the teaching of track and field lessons she participated in with Dr. Mulligan showed her how she could effectively present the content to students.
Case Two – Steven

*General Information*

*The Teacher*

Steven was completing a Master’s degree in education at a large mid-western state university. Two years prior to beginning his Master’s program, Steven graduated from the same large mid-western state university with a physical education degree. Steven’s physical education degree did not include teacher certification. The year prior to entering graduate school, Steven enrolled in the courses required for entrance into the graduate program. During his graduate program Steven was specializing in the teaching of physical education. He was in his fourth quarter of a five-quarter program. During the third quarter, Steven’s course work involved a secondary physical education methods class as well as a 10-week teaching internship where he was assigned to teach physical education to urban high school students.

*Pedagogical Skills Learned Prior to the Secondary Field Experience*

The previous quarter Steven had completed an elementary physical education methods class as well as a 10-week elementary physical education teaching internship at a suburban elementary school. As indicated by comments from his supervisor, Steven gained an abundant amount of pedagogical knowledge during his elementary teaching placement. His university supervisor visited at least once a week and provided oral feedback immediately following an observation and once or twice a week she provided written feedback for further reflection. From the summary comments Steven’s university supervisor provided at the conclusion of the internship, it was obvious that Steven was
able to consistently demonstrate a variety of effective teaching practices. Examples of comments provided by the university supervisor, and agreed upon by the cooperating teacher, included,

...attendance procedures and warm-up routines were established which resulted in quick class starts and reduced initial management time. Appropriate student behavior was recognized with positive reinforcement. When inappropriate behavior was noted, Steven stopped the class, reviewed the expected behavior with students, refocused students on the task at hand, and continued with the class. Steven was able to minimize off task and inappropriate behavior by consistently moving throughout the activity area, scanning the gymnasium, and providing feedback across space.

Students spent the majority of their class time engaged in activity. This was the result of careful planning on Steven’s part. He organized and set up his classes so that transitions were minimal, lines were short or nonexistent, and all students had a piece of equipment.

Content provided to the students was developmentally appropriate. Modifications were provided to students who were having difficulty; challenges were offered to students who found the tasks easy. While students were practicing skills, Steven was able to observe student performance and offer positive and specific feedback to students which helped students improve their performance.

Demonstrations provided were always accurate and often involved the help of a student. Instructions given were clear - students always knew what they were supposed to do. Plenty of encouragement was provided to all students. Steven always left students with the impression that they could successfully complete the task.

Steven regularly reflected on his lessons. He was able to verbalize what went well, what needed improvement, and he was often able to provide alternative suggestions to further improve his classes. He was always open to feedback from [his university supervisor] and his cooperating teacher. After receiving feedback, he worked to implement suggestions in to his future lessons. ... (university supervisor summary notes, March, 1999).

*The Units*

As part of his teaching responsibilities, Steven was assigned to teach archery and fitness. Archery was taught on Mondays, Wednesdays, and Fridays and fitness was taught on Tuesdays and Thursdays. This schedule was in place for the last five weeks of
the semester. Archery was the unit of unfamiliar content that was studied, and fitness was the unit of familiar content that was studied.

On the rating scale beside archery, Steven had circled a “2” on a 5-point scale for knowledge of content and a “1” for ability to teach the content. During the initial interview, Steven was asked about his prior experience with archery. He responded by saying that as a boy scout he had done a little bit of shooting but that he had never participated in archery during any public school physical education classes, he had never taken an archery class as an activity in university, he had never coached archery, never taught archery before, did not watch archery on television and he had never shot at anything. When asked if he would classify himself as a novice, he simply stated, “yes”. Julie, Steven’s cooperating teacher did not have an extensive archery background herself, but she stated that since she had taught archery for seven years, she felt pretty experienced and comfortable with it.

On the other hand, Steven felt quite comfortable with having to teach fitness. When asked about his prior fitness experience he stated he had been active all his life and that his love of, and passion for fitness had led him to complete the requirements that earned him certification as a personal fitness trainer. The year between undergraduate and graduate school, he had worked as a personal trainer. When asked if he had any reservations about teaching fitness, he responded quickly with a “no”. When asked if he foresaw any problems with his ability to teach fitness, he responded by saying, “No, I’m pretty confident about that” (initial interview, p. 12). Although his cooperating teacher had taught fitness for the past seven years, when asked about her background in fitness,
she stated, “it’s very minimal, it’s not my interest. I’m personally interested in it, but not interested in teaching it” (initial interview, p. 10).

His comfort level in fitness and archery was also evident on his mid term evaluation. The midterm evaluation was conducted approximately six weeks into the internship and a week and a half into his fitness and archery units. On his self evaluation Steven wrote, “I am more comfortable in fitness than I am in archery, but I am coming around” (participant midterm self evaluation). His university supervisor wrote, “Steven’s knowledge of weight training has been apparent” and provided no comments about his knowledge of archery (university supervisor’s midterm evaluation). Likewise, his cooperating teacher’s midterm evaluation stated, “A high level of knowledge pertaining to fitness and weight training” (cooperating teacher’s midterm evaluation). She offered no comments regarding his archery knowledge.

Research Questions

Similar to the format followed with Case One, this case will also address the types of knowledge sought or received by category, first referencing the unfamiliar unit of content, followed by the familiar unit of content. Again, following the pattern previously used, the Knowledge of Context area will be discussed before either unit is discussed separately as there is information contained in the following Knowledge of Context discussion that pertains to both the unfamiliar and familiar units under study.

Knowledge of Context

The knowledge of context area includes four components. One is knowledge of the school and includes “the school ‘culture’, departmental guidelines, and other
contextual factors at the school level that affect instruction” (Grossman, 1990, p. 9). The second component is knowledge of students and includes knowledge about the particular students in the school in which one is working. The third component includes knowledge of the district and this refers to an awareness of the “opportunities, expectations, and constraints posed by the district” (Grossman, 1990, p. 9). The final component in this area is knowledge about the community and this refers to knowing about the characteristics of the community in which the school is located. For this study, in the knowledge of context area, data are available for the knowledge of district, knowledge of school and knowledge of students categories. There was no evidence to suggest that Steven sought or received knowledge about the community throughout the duration of this study.

Knowledge of Context: District

Steven was teaching high-school physical education. The State requirements for high school graduation included one physical education course. The district Steven was teaching in followed State graduation guidelines. This is the only reference Steven made to having knowledge related to the district, it’s expectations, or constraints.

Knowledge of Context: School

Steven received information about a number of contextual factors that influenced instruction. These contextual factors included the school schedule, space and equipment, and the departmental guidelines.
School schedule.

When asked if he learned anything about the school, he stated, “Yes. We talked about the school in January. Julie helped me learn about the school and the students” (final interview, p. 12). More specifically, Julie informed Steven about the general school schedule, arrival and departure times, class times, when bells ring, what the schools policies were with respect to attendance, fighting, and discipline, what his teaching schedule was like in particular, and where certain rooms and people in the school were located. Steven stated this information was obviously useful as it helped him function on a daily basis. To expand, the school in which Steven was teaching offered four 90-minute classes each day. Steven’s personal daily schedule included a preparation period from 7:00-7:30 am; period one which was scheduled from 7:30-9:00am and during which he taught archery or fitness; health was taught period two which ran from 9:00 to 10:30 am; lunch was scheduled from 10:30 to 11:30; during period three, which was scheduled from 11:30 to 1:00, Steven co-taught archery with one of the other physical education teachers; and during the final period of the day, which was scheduled from 1:00 to 2:30, Steven and his cooperating teacher were responsible for supervising the PEAK room which was an in-school suspension room. Steven’s schedule was such that archery would be taught on Mondays, Wednesdays and Fridays for five weeks, and fitness was taught on Tuesdays and Thursdays for the same five-week period. If it rained on a Monday, Wednesday or Friday, Steven would simply switch to fitness and complete the scheduled archery lesson the next day.
Space and equipment.

The space one has to conduct lessons is an obvious contextual factor that influences instruction. This information can be easily obtained by observing the surroundings when Steven was teaching. The school that Steven completed his secondary teaching internship was a large, two-level, urban, high school, located in a large mid-western city. The inside space available for Steven to teach his fitness unit included a large gymnasium, a classroom, and a weight room. Outside there was a track, and plenty of open space, including space available for softball, soccer, and football. Equipment for use in the weight room included free weights, a global exercise machine, as well as free weight machines that isolated the shoulder, pectorals, back, and leg muscles. The classroom was arranged in such a way that there was space available in half the room for Steven to complete lessons. For example, a lesson on resistance exercises to build muscular strength was conducted in the classroom using towels. There was enough room for each pair of students, approximately 10 pairs participating that day, to spread out in a semi-circle formation with enough room between pairs so as not to invade others’ space. During the fitness unit, Steven would occasionally use the gymnasium to conduct warm up exercises, which often consisted of low organized games that were used in an attempt to elevate student heart rates. Some days, Steven was required to share the gymnasium with another class. In such cases, each class had use of half the gymnasium. According to Steven, half the gymnasium was enough room to complete the activities he had planned.
Archery was taught outside. As previously mentioned there was plenty of open space outside for use. The space Steven used was located behind the gymnasium, in the open space between the back of the school and the softball field. An asphalt walking path that ran behind and along side the back of the school was used as the firing line. The archery targets were set up about 12 to 15 feet from the path. To get to the shooting range, students would exit the far end of the gymnasium, walk a few feet to their right, round the corner, and they would be at the shooting range. They would return from the shooting range in the same manner as they arrived. Six targets and target stands were in working order and available for Steven to use each lesson. A bow was available for each student and there were enough arrows so that each student who was shooting, was given six arrows to shoot per end.

Departmental guidelines.

Departmental guidelines are included in the Knowledge of Context: School category. The physical education department in the school in which Steven was teaching had developed and was using a ‘Behavior Profile’. According to Steven’s unit plan,

Using this profile, the teachers are able to accurately track a student’s performance in Physical Education regarding their five fundamental rules.

1. display teamwork at all times.
2. respect the rights of others
3. show prompt attention to teacher instructions
4. demonstrate a positive attitude
5. be dressed for active participation.

These ‘grade enhancers’, as they are called, weigh equally in determining their grade for the day. Failure to do one of these will result in the loss of a letter grade for the day. Failure to do two of these will result in the loss of two letter grades for the day, and so on. This daily grade is tallied at the end of the grading period (5 points/day for an A, 4 points/day for a B, etc.) and is counted as 40% of the grade for the nine week grading period. The other 60% is broken down equally (15%) into 4 categories.
• Skills test
• Written tests and quizzes
• Peer assessment
• Cooperative team rating

(Archery Unit Plan, p. 13).

While interning in the school, Steven was required to follow the guidelines the physical education department had set. There were times when the researcher was observing, that Julie, the cooperating teacher, was heard asking Steven if he was keeping track of the students’ behavior and asking to see his attendance book. Steven followed the department’s guidelines for his entire practicum.

_Personnel._

Steven was the only physical education intern at the school, at the time. His cooperating teacher was in her eighth year of teaching; it was her second year at the present school, and she had spent six years teaching at another urban high school in the same district. The cooperating teacher was an experienced and respected teacher who was also acting as a clinical educator at one of the local state universities.

_Knowledge of Context: Students_

In terms of the number of students who attended the school in which Steven was teaching, the school was larger than the average state high school and included a population of 452 male students and 416 female students amounting to a school total of 868 students. Of these 868 total students, 297 students were classified as White, 546 were classified as Black, 12 were classified as Hispanic, 10 were classified as Asian Pacific Islander, and 3 were classified as American Indian/Alaskan Native. There were no students classified as Multi-racial (personal communication with Ohio Department of
Education Help Desk Personnel). Approximately 12% of these students were classified as disabled. The total annual spending per pupil was $683.00 above the state average for high schools. The student attendance rate was 89.2%, which was less than 1% higher than the district average of 88.9% but 4.3% lower than the state average of 93.5%.

Academically, state proficiency tests scores indicated that at the grade 9 level, the school scored between 1.9 and 9.6 percentage points above the district average in all subject areas but anywhere from 2.4 to 18.2 percentage points below the state average in all subjects except writing where the school was 1.1 percentage points above the state average of 91.5%. Grade 12 proficiency test scores indicated that the school was between 4.8% and 10% below the district average for all subject areas except mathematics where they were 1.8% above the district average of 31.5%. In comparison to other high schools in the state, the school scored between 15.8% to 30.2% below the state average for all subject areas (http://abc000.abc.state.abc.us/lrc_www/99Build/123456.pdf).

Steven had 23 students registered in his high-school physical education class that served as the focus for this project. As previously mentioned, the requirements for high school graduation included one physical education course. Most of Steven’s students were enrolled in the class because it was a required course. When asked to describe his students, Steven stated they were, “very unmotivated unless they seem to be getting something out of it” (initial interview, p. 5). Steven’s cooperating teacher agreed, stating, “I would say that there is a large portion of them that are apathetic; they’re apathetic about everything which makes it a little more difficult to find things that are pertinent to
them” (initial interview, p. 6). This information was gathered after spending a short period of time in the schools watching and assisting his cooperating teacher teach. It was useful information as Steven was aware of the challenges of motivating students to participate.

At the end of the internship as the researcher, Steven, and his cooperating teacher were reflecting on his time in the school, it was pointed out to Steven that students respond to teachers in ways that may differ from what he may have expected. For example, during informal conversations that occurred before class, or on the phone as future meeting times were being discussed, Steven expressed concern that he felt he wasn’t connecting with his students. He stated he felt this way because they didn’t generally respond to him in a manner that he expected. For example, Steven expected students to address him by name rather than with “hey teacher”, and he expected that they would follow through when he asked them to do something. He also stated that he often felt the students were using a negative tone when they talked to him. During the final interview, I asked Steven if he still felt that way or if things had improved. He responded that he felt things were the same but couldn’t provide a reason as why or what he could do next time to improve the situation. Julie offered the following advice,

Sometimes you didn’t think they were responding to you but they really were. You have to be realistic about how things are going to go when you first start out. This isn’t your own program, and you’re just learning how to take these kids. Having spent 7 years in an urban school, I know students just react differently to things. The way they react is often offensive to you or me, but we have to remember that the way we react is often offensive to them. You have to learn that it’s a give and take with respect to what they’re doing, what they’re saying, or how they’re saying it. It’s not meant to be offensive; it’s just their nature and vise versa. Eventually you get used to them and they get used to you. I think you did communicate well with them and I think they liked you. They would do pretty
much anything you asked them to do as long as you were consistent about it and you persisted. So, consistency and persistence is necessary (final interview, p. 16).

Steven joked that he knew Julie was right, and continued to comment how much her point was reinforced as he looked back over the unit. He further stated,

I think now after 8 weeks, I understand these students a little bit. I’m not going to say I fully understand where they’re coming from. I don’t think after 7 years Julie fully understands them. I think I have a better grasp on them. It’s also having to come to grips with the fact that you are not in the schools as a student, you’re in the schools to be a teacher and you have to separate those two (final interview, p. 17).

R.Q.1. During a secondary physical education teaching internship, what are the types, sources, and perceived relevance of knowledge acquisition when teaching content perceived to be unfamiliar?

Subject Matter Knowledge

The general knowledge area titled subject matter knowledge includes the three components: content knowledge; knowledge about the syntactic structures; and knowledge of the substantive structures of the discipline. Content knowledge and substantive structures are the two components for which the participant sought knowledge from the subject matter knowledge area. There is no evidence to suggest Steven acquired any knowledge relative to syntactic structures.

Subject Matter Knowledge: Content Knowledge

Archery was the unit of unfamiliar content Steven taught. The major sources of Steven’s content knowledge came from books he was able to gather from various sources and old unit plans his cooperating teacher provided for him. Steven found these sources of information very relevant.
Initially, to prepare to teach the unit, Steven sought information about the content of archery. In an email sent to his university supervisor dated April 12th, Steven wrote about the progress he was making on his archery unit plan. He commented, “my unit plan is coming along very slowly. . . Dr. M gave me her Archery ‘Steps to Success’ book, and I have the Tactical Games book by Oslin, so I do have a starting point” (university supervisor correspondence, April 12).

Prior to any observations of Steven’s lessons, and unaware of previous discussions with his university supervisor, Steven was asked by the researcher how he prepared for the upcoming archery unit. He responded by saying:

[I] collected all of the materials I could from Julie, from past experiences that she had. Then I got the Steps to Success archery book, and some paperwork that I had from the hunter’s safety course, but that ended up not being useful at all. I also used the tactical book (initial interview, p. 2).

More specifically, the materials his cooperating teacher had given him to work from included, “two unit plans from student teachers she had before, a score sheet, a safety check list, and some safety commands” (initial interview, p. 3). When re-asked the same question near the end of the end of unit, Steven responded with the same answer (May 26, p. 11).

When asked specifically about the usefulness of the information Julie provided, Steven stated,

Pretty useful with the games she used to play. The archery games and contests that she had are going to be used in my unit. I will have them keep score different ways. What she gave me was pretty useful. But I had to come up with a lot of stuff on my own (initial interview, p. 2).
The additional information, that is, the information he had to come up with on his own, came mainly from two sources: “mostly from adapting the target part of the tactical book to archery” (initial interview, p. 2) and “with archery, I definitely pick it up [referring to the Steps to Success book] and go step by step. ...I pretty much follow the book” (interview, May, 26th, p. 7).

References listed on the archery unit plan included the two sources previously mentioned, that is, the Steps to Success book (Haywood & Lewis, 1997) and the Teaching Sport Concepts and Skills, A Tactical Games Approach book (Griffin, Mitchell, & Oslin, 1997). To check if other sources were used, Steven was asked by the researcher at least once per post lesson interview the source of a specific activity. In every instance, Steven stated that Julie had given him the idea for the activity or it came directly from one of the two books previously mentioned (for example, May 26th, p. 10).

The books and information gathered proved useful as they were the main sources of information for putting the unit plan together. More specifically with respect to books, Steven found the Steps to Success book (Haywood & Lewis, 1997) somewhat useful, as he explained, “For the technical stuff, it’s ok. That’s where I got the 8-step shot preparation” (Tuesday May 11, p. 8). What Steven found more useful was the Teaching Sport Concepts and Skills, A Tactical Games Approach book (Griffin, Mitchell, & Oslin, 1997). As Steven stated, “The book I’m using for most of my lesson is the tactical book (Tuesday May 11, p. 8).

Having never taught archery before, Steven turned to a number of different sources to provide him with the content he needed to teach the unit. The sources he
turned to included books and previous unit plans his cooperating teachers gave him. To varying degrees, the books and unit plans proved to be useful sources of information.

Subject Matter Knowledge: Substantive Structures

When Steven taught archery it would appear from the information gathered that he had adopted a combination of the academic and technological orientations. Rink (1993) described the emphasis of the academic orientation in physical education as focused on “games, sports, dance and fitness” (p. 15), and the emphasis on the technological orientation in physical education as focused on “…research based teaching skill development” (p. 315). Steven sought information about how to teach the shooting skills of archery to his students. He also looked for a number of different activities to help keep his students engaged in the unit. Observations of his classes indicated that he did attempt to teach the students how to properly shoot arrows. Post lessons conferences he had with his cooperating teacher often focused on teaching behaviors Steven could improve upon and how to incorporate the behaviors discussed in future teaching episodes. University supervisor field notes indicate that a number of different teaching behaviors such as feedback, movement, and use of cues were recorded throughout the practicum and discussed following lesson observations.

General Pedagogical Knowledge

The general pedagogical knowledge area contains four components, namely, the individual’s knowledge and beliefs about learning and learners; knowledge of general principles of instruction; knowledge and skills related to classroom management; and knowledge and beliefs about the aims and purposes of education. Learners and learning,
classroom management, and curriculum and instruction are the components for which the participant provided information and will be the components discussed from this knowledge area. After analyzing all data, no evidence was found that demonstrated Steven sought or received any knowledge related to the aims and purposes of education.

General Pedagogical Knowledge: Learners and Learning

Steven learned that students learn and demonstrate their learning in different ways. For example, after the completion of the archery unit, Steven was asked if and what he thought his students had learned over the course of the unit. He responded by saying,

I think they all learned something. I don’t know if I’d say they learned a lot. If they had already shot before, I think they learned about different kinds of competitions, like cloud shooting for example. If they had never shot before, I think they learned how to shoot from the line to the target (final interview, p. 6).

In my role as a researcher, I had heard students tell other students what and how to do things, and I pointed this out to Steven. One day in particular, a substitute teacher was present. The substitute teacher picked up a bow and arrow and started to pretend to shoot at the target while Steven and a couple of other students were setting up the targets. Those students who were around the substitute teacher were telling him, “No, you can’t shoot until he tells you”, “You’re not supposed to pick up the arrow until he tells you”, “You don’t have the arrow lined up properly”, “Don’t point that arrow this way”, “Put your arm in”, “You’re not supposed to pick up the bow until the targets are set up”, and “That’s not how the arrow goes” (researcher field notes, May 14). During the final interview, I asked Steven whether he felt the comments the students made to the
substitute teacher were an indication of student learning. He wasn’t sure. Then Julie stated,

That goes back to how you expect students to learn. What are you looking for in deciding if your students have learned? The fact is, sometimes students are learning, they just learn in different ways. Or maybe they demonstrate their learning in ways other than the way you or I might. Just because they’re not exhibiting the exact signs you had hoped for doesn’t mean they didn’t learn anything. You’ve got to look for signs of learning in different ways (final interview, p. 6).

Steven stated that he’d never thought of that until Julie brought it to his attention, and that he hadn’t picked up on any of the signs that his student’s were actually learning. He did state that it was something he’d have to consider more in the future.

Steven initially described one way he thought students could demonstrate their learning, for example, if they could shoot the arrow they learned something. The researcher and cooperating teacher supplied Steven with information about different ways students could display their learning. Steven found this information relevant as he had never thought about student learning in the ways presented and that he would give it more thought in the future.

General Pedagogical Knowledge: Classroom Management

Steven did receive knowledge about classroom management from his cooperating teacher. This is knowledge Steven purposefully sought at the beginning of his practicum. Before Steven began teaching the archery and fitness unit, he was in the school for half-day observations. During this time, he stated he purposefully discussed with Julie, what her classroom rules and routines were. According to Steven, he did so in an effort to maintain the same class structure and order so there would be continuity for the students,
and the adjustment to a new teacher would be minimized. To this end, Steven maintained the same classroom routine that Julie had been using, that is, students received a specific amount of time to change at the beginning and end of class, the class began with attendance and a warm-up, and students were expected to help with the set-up of equipment.

Although Steven was initially informed that students were expected to help with the set up of equipment, he was unsure how to go about this. Julie offered some suggestions. For example, during an end of the day conference Julie and Steven were having about the day’s classes, they were talking about various events that occurred in the classes just taught and where improvements could be made. The discussion turned to the archery class and who was responsible for setting up. Julie had at first suggested that the students did a better job getting out the equipment, as they took it from just outside the equipment room to the outdoors. Then she continued,

Although they got it outside, they did not set it up and you spent a good period of time setting it up. During that time, you didn’t say anything to them. They were just standing there waiting. When you were finally done, after 5 or 6 minutes, then you prompted them to get their things and in their places (student teacher – cooperating teacher post lesson conference, May 10, p. 3).

She continued by offering the following suggestions to improve the daily practice,

Use your teams. Say, “Ok, team 1. Make sure you get this and this and put it out. Team 2, someone is responsible for your target, bows and arrows”. Work at it that way, by giving specific instructions. When you give general instructions to the group as a whole, I think they think someone else will do it and it never gets done. But, if they know someone on their team has to do it, it might help. It might not (student teacher – cooperating teacher post lesson conference, May 10, p. 4).
At the time, Steven said it sounded like a good idea and agreed to try it. However, during the following Friday’s class when a substitute teacher was present, Steven spent the first 8 minutes of the class setting up the targets as the students stood around the substitute teacher telling the substitute teacher and explained to the teacher how, and how not to hold a bow and arrow (researcher field notes, May 14). But, a week later during another post lesson conference, Julie asked Steven what he thought went well during the morning’s archery class. Steven stated, “the set up went much better today” (student teacher – cooperating teacher conference, May 19, p. 4). Julie agreed and asked what he had done differently. Steven responded by saying,

   I told every team to get their own target out. Maybe if I had done it this way in the beginning, by now it would be better because they would understand where the targets had to go and everything (student teacher – cooperating teacher conference, May 19, p. 4).

   Some days, Steven would allow the students to leave the shooting range early to play basketball. However, on other days, he would not. When asked about this, he said it was a way to gain compliance, that it was a reward for good behavior and participation. When students were not allowed to play basketball, they were told why and Steven said it helped motivate some students to participate more. Allowing the basketball reward was something Steven said he got from Julie, as she often used it as well. Steven found it a useful tool as it often worked.

   In relation to classroom management, Steven decided to follow the routines his cooperating teacher had initially established. Although one of these routines was to have the students take responsibility for the set-up of equipment, it took nearly the whole unit for Steven to implement this procedure. When he was finally able to do so successfully,
he found the suggestion useful. Also, Steven continued to offer free time for basketball play in return or as a reward for good and on task behaviors.

*General Pedagogical Knowledge: Curriculum and Instruction*

The curriculum and instruction component includes general principles of teaching and learning such as academic learning time, wait time, and a number of effective teaching strategies. Discussed below is information Steven received that was intended to help improve the overall class climate by interacting positively with all students, and ways he could increase student participation and thus increase the time students spend on task.

As previously discussed (in Chapter 2), effective teaching strategies include creating a positive learning climate and communicating with learners. Julie provided Steven with some information about how he was doing in this area and what he could do to improve. For example, during an end of the day conference, Julie presented a coding sheet that she had completed while observing one of Steven’s earlier classes. The coding sheet recorded the number of male and female student interactions in the areas of praise, instruction, and management, and indicated Steven directed nearly all of his comments to the male students and the majority of his comments were managerial in nature. Steven was shocked at the results. Reviewing the coding sheet with Julie, he stated, “I wouldn’t have thought that at all” (student teacher – cooperating teaching post lesson conference, May 19, p. 1). Julie asked Steven what he thought the results indicated and he stated, “That I pick out the fact that the guys are not doing what they’re supposed to be doing rather than picking out the girls. I’m not as specific with the girls as to what’s supposed
to be happening” (student teacher – cooperating teaching post lesson conference, May 19, p. 1). Julie clarified how she interpreted the coding sheet,

It’s not a matter of specificity. You’re not even talking to them! You’re not even making contact with them! Also, if you look at the number of episodes total that you spoke to students and see the ratio between management, praise, and instruction, most of your comments have to do with management. …The more praise you can offer the better, even if it’s the general kind, like ‘hey, good job, way to go’ – they will eat that up. For example, I watched the line today and Dreann was shooting today. For the first time, she shot today. It was during cloud shooting. After her attempts, she put her bow down and she was looking around. Looking for someone to say something. She was so happy. I saw that and said, ‘Hey Dreann, way to go’ and that made her want to do more. It’s a matter of picking out stuff you can say to them that’s positive, even if you have to make it up a bit sometimes. If the arrow goes in the ground, you say, ‘Hey, nice try. Way to go. Next time you’ll do better’. If you can do that, you’ll get more students to buy into what you’re doing. But if it’s all management, you’re not going to get very far with them (student teacher – cooperating teaching post lesson conference, May 19, p. 2).

Steven understood what Julie was trying to say and stated that he agreed with her, but was “worried about sounding fake” (student teacher – cooperating teaching post lesson conference, May 19, p. 1). Julie indicated that she understood why he could feel that way but continued with,

If it’s natural, not totally made up, then it won’t sound fake. For example, something like, “hey good job. Way to go” or “Keep trying”, that’s natural and can be said in a manner that doesn’t sound fake. They really eat it up. Little kids love praise and so do the older kids. The older kids are just a little less overt about wanting it. So I would work on providing more praise statements to all students (student teacher – cooperating teaching post lesson conference, May 19, p. 2).

Steven found this information useful and relevant as he kept coming back to it throughout the conference. Later in the conference he stated,

I hate talking about this all the time, but providing the girls with an equal amount of attention is definitely something I have to work on. When we studied this in class, I was one of the first people say, “Who doesn’t give equal attention?” So,
to the girls, it probably seems like I talk to and pay attention to the guys a lot more (student teacher – cooperating teaching post lesson conference, May 19, p. 4).

Julie began to offer some insight, but Steven interrupted her and said, “You know, with the group of girls on the end who got their target out and set up quickly and were waiting for the rest of us, maybe I could have yelled across to them, “Thank you for getting set up” (student teacher – cooperating teaching post lesson conference, May 19, p. 4).

Steven considered a successful lesson one in which his instructional goal for the day was met and for that to occur, each student had to participate. According to Steven,

For the most part, every time a student has participated the entire class, I’d say it’s been successful. If they’ve chosen not to participate or chosen to sit under a tree or sit by the bench, and not get as many repetitions in as they could, then it hasn’t been successful (post lesson interview, May 26, p. 2).

After coding one of Steven’s lesson, Julie suggested that minor adjustments could be made that would help him improve student participation. As he was reading over Julie’s comments, Steven stated, “That’s a good idea. Get rid of the bench” (student teacher – cooperating teacher post lesson interview, May 10, p. 2). To clarify her written comments, Julie stated,

Put it over by the batting cage and then you won’t have to worry about it. I think you had one target today that wasn’t used at all during first block or it was used very sparingly because the students were sitting back on the bench. I think only one or two people came out every third or fourth round to shoot. If they don’t have the comfort of the bench, then they may be more inclined to participate (student teacher – cooperating teacher post lesson interview, May 10, p. 2).

Steven agreed that it sounded like a good idea. However, a week later Julie commented, “And what about the bench? You keep talking about moving the bench.
You may want to think about whether or not you want it to disappear during first block”
(student teacher – cooperating teacher post lesson conference, May 17, p. 2). Another
week later he still had not moved the bench and he still had students who arrived at class,
went directly to the bench, and sat there for the majority of the time. When asked about
this, he commented,

Honestly, I wasn’t focused on the surroundings as much as I was on the lesson.
Every time we’d get out there I’d realize I hadn’t moved it. Whenever I planned
the lesson, I always took into account the content. I never took into account the
surroundings (May 26, p. 3).

Steven was asked whether or not he thought moving the bench would have made
a difference in student participation. He stated,

In the morning class it would have but not in the afternoon class because they
would go and sit under the tree anyway. None of them would sit on the bench
because it was too hot (the bench was directly in the sun) (May 26, p. 3).

Julie offered Steven another suggestion on how to increase participation.

Previously under the knowledge of context: school category, the ‘behavior profile’ was
discussed as a departmental guideline Steven was required to use. As pointed out, Steven
used the profile regularly. During a post lesson discussion, where Julie and Steven were
discussing student participation, Julie suggested to Steven that he use the Profile, not only
to track a student’s grade, but as a motivator for students to participate. She stated,

Take these out with you (pointing to the grade book) and start showing the F’s in
the grade book, and talk to them about it. In some cases some of them have been
doing good until now. Find out why not now. Ask them if they realize this is
happening to their grade and if they are happy with that (student teacher –
cooperating teacher post lesson conference, May 10 p. 5).

In an effort to hold students accountable and keep them on task, Steven had
devised a peer check list and a score sheet. Students were supposed to use both every
class. There was the occasional day when Steven made reference to the sheets, but there were many days when there was no mention of them. When asked about this Steven indicated that when used, they helped keep students on task but “I just didn’t keep on top of the scores, and keep track of the score coding sheets” (Final interview, p. 6). When asked why he simply responded with, “lack of teacher consciousness” (Final interview, p. 7).

Steven received a variety of information related to classroom management. For example, to help improve the overall class climate, it was suggested that Steven increase the amount and type of interactions he had with students, males and females alike. Also in an effort to improve participation, it was suggested that Steven move the bench that was situated behind the shooting line, so as not to provide students with the opportunity to sit out. It was also suggested that the students’ grades be used as motivation to participate and pre-made score and check-list sheets, be used to keep students on task. These instructional strategies were provided by his cooperating teacher. The information was relevant as Steven initially agreed that the bench was providing an easy way for students to become non-participants, and he was aware of the importance of providing feedback, knew he was having difficulty with it, and knew he needed suggestions to help him improve. When he was able to incorporate the suggestions into his lessons, improvements were made.

Pedagogical Content Knowledge

Four components are included in the pedagogical content knowledge area. These include, knowledge and beliefs about the purposes for teaching a subject at different
grade levels, knowledge of students’ understanding, conceptions, and misconceptions of particular topics in a subject matter, curricular knowledge, and knowledge of instructional strategies and representations for teaching particular topics. There is evidence available for all four components.

**Pedagogical Content Knowledge: Conceptions of the Purposes for Teaching Subject Matter**

The conceptions of the purposes for teaching subject matter component of pedagogical content knowledge includes “knowledge and beliefs about the purposes for teaching a subject at different grade levels” which are “reflected in teachers’ goals for teaching particular subject matter” (Grossman, 19990, p. 8). When asked about his goals for archery, Steven stated, he wanted his students to be able “to run a student run tournament, compete in a student run tournament, and be able to be a performer, be a score keeper, and be an official” (initial interview, p. 3). Steven stated that he decided on the goals himself as a result of his prior experiences watching students participate in a previous unit. According to Steven, he felt that if he focused on the game, or here an archery contest, the students would be more likely to buy into what he was doing.

Observations of Steven’s lessons showed that he spent the majority of the unit teaching students how to fulfill the role of performer. That is, the instruction that Steven did provide, involved him demonstrating and explaining how to shoot. Steven did take part of one lesson (May 5) to explain to students how to keep score of their shots. He provided students with a tally sheet where students were to record their scores from their daily practice sessions, time for which was provided at the end of the class. Occasionally
he would verbally ask students if they were keeping score. More rarely would he actually check to see that students were actually recording their scores on the score sheet. Ironically enough, he collected the score sheets at the end of each class. His intention was to provide awards to students based on the results of their daily score cards (Unit plan, p. 10). This intention never materialized. The competitions students did compete in were organized by Steven. Officiating was never discussed.

At the end of the unit, when asked if he met his initial goals, Steven immediately stated ‘no’ and was quick to answer that it was a result of him not feeling comfortable, being unable to read his students properly, and thinking that the students were not enjoying the unit. In retrospect, he felt his goals were achievable if he focused on them and held the students more accountable throughout the unit.

Pedagogical Content Knowledge: Knowledge of Student Understanding

Knowledge of student understanding refers to a teacher being cognizant of the conceptions or misconceptions that students may have about a particular topic. During the initial interview, Steven was asked if he foresaw any areas that the students may have problems with related to shooting arrows. His response was “No, I think they’re all pretty much capable of pulling the bow. I went and checked the bows and none of them are very heavy” (initial interview, p. 8). After having taught archery seven times previously, his cooperating teacher commented that students generally have problems with,

The arrow on the arrow rest. It’s always difficult for them to keep the arrow on the rest before they let go. They have trouble all the way through the steps when they are getting ready to release the arrow. A lot of times they let go of the arrow but not the strings so the arrow doesn’t go anywhere (initial interview, p. 8).
This information provided by the cooperating teacher would prove to hold true. At least once on every videotape, there is at least one student who had difficulty releasing the string. On the videotapes, arrows can be seen falling off the bow rest and landing by the shooters’ feet. In cases where the arrow was not directly visible, the student can be seen bending down to pick up the arrow, and then re-adjusting it on the arrow rest in preparation for the next shot.

Through informal discussion with his students, Steven concluded that the students had limited exposure to and experience with archery. This is evidenced by the needs assessment he wrote and included as part of his archery unit plan. In the needs assessment he wrote,

“This will be the first exposure that most of the students have had to Target Archery. There are several students that have asked if they can bring in their own equipment, so that led me to discover how much they know about archery. Two of the students in particular have hunted using a cross-bow, but have never been exposed to the fundamental practices of target shooting. With those things in mind, I have decided to assume that the skills of the students will be at the novice level (archery unit plan, Needs Assessment, p. 1).

Earlier observations in the school had led Steven to the conclusion that all the students wanted to do was play the game. He felt the students weren’t motivated to participate in drill practice and only showed interest in the class when a game was introduced. His previous observations led him to the conclusion that the students’ preconceptions of archery were that “it is just shooting” (initial interview, p. 3). As a result, he decided to incorporate more game play, or in this instance, more archery contests in an effort to captivate and motivate the students to participate. As Steven stated, “I figured I’d get them to shoot in an actual tournament of archery as it would be
easier to motivate them [to participate] if I was actually driving them towards the goal they already conceive as archery” (initial interview, p. 3). When asked if he asked anyone to confirm his perceptions, he said, “Yes, I asked the students and they told me” (initial interview, p. 4). This information proved to be relevant as Steven used it when planning his unit. Based on this information, Steven planned his archery unit such that he was going to,

Get them to shoot every lesson first – which is the tactical model, whole, part, whole. So, get them to shoot first, then bring them in and say, ‘now, what do you need to do to make the arrow go in the proper direction?’ I will ask them instead of tell them or lecturing them upfront. I figured that would create more relevance because if they miss, they will want to find out why they missed (initial interview, p. 7).

Prior to teaching the unit, Steven’s cooperating teacher informed him that the students would likely have trouble keeping the arrow on the arrow rest. Also, through his own observations and discussion with students he was aware that most students had limited exposure to archery and most were more interested in playing the game than in skill practice. Steven initially found this to be relative as he took it into consideration when planning, that is, he planned to have students participate in min competitions each class.

Pedagogical Content Knowledge: Curricular Knowledge

One aspect of ‘curricular knowledge’ includes knowledge of the horizontal and vertical curricula for a subject (Grossman, 1990, p.8). During the course of this study, Steven did not actually seek information relative to this category, however, this type of knowledge did come up during conversation. During a post lesson interview, I asked Steven to comment on his ability to plan progressions. He stated,
I don’t always know if what I’m planning in archery is actually a step up (a progression) or sideways. For example, if I’m conducting a tournament and there are two activities that they’ve never done, and both activities are accuracy activities, I don’t know if the activities are refining for them or extending (May 26, p.10).

I followed up Steven’s comment by asking him how he knew, that is, did he ask Julie or classmate, or did he try to answer the query on his own. He responded by saying that he didn’t ask anybody to help him clarify the problem but rather “I just planned the activities” (May 26, p.10) and included them in his lessons in an effort “to have variety. I figured they didn’t want to shoot at a target the whole time” (May 26, p. 10). When asked why he didn’t discuss this with Julie, he stated he assumed if it was incorrect or should be arranged in a different manner, than Julie would have said something.

In another instance regarding the ability to plan progressions, Steven was asked what he would do the following year, if he had to teach an archery unit to the same group of students, that is, students who had already completed the current archery unit with him. He responded with,

I would do a review for a while to see how much they remembered from what we learned and then let some of the people catch up that missed things. And then, ah, this is tough. Definitely make more competitions. Actually try to come up with some more creative competitions. I don’t think there’s a lot more in depth skills in archery then they learned. Maybe exposing them to different types of equipment (final interview, p. 9).

Steven’s curricular knowledge included being uncertain of whether a particular activity, was, as he said, a refining or extending activity. Also, after teaching the unit, Steven was unsure of how he would extend the unit.
Pedagogical Content Knowledge: Knowledge of Instructional Strategies and Representations

Knowledge of instructional strategies and representations includes instructional strategies “for teaching particular topics. Experienced teachers may have developed rich repertoires of metaphors, experiences, activities, or explanations that are effective for teaching a particular topic” (Grossman, 1990, p. 9). Steven’s cooperating teacher offered information on routines to use to decrease student talking and information relative to safety. Routines and safety issues were previously discussed as components included in the classroom management category. However, here they are placed in the knowledge of instructional strategies category because the routines and safety issues are specific to the teaching of archery. The routines and safety issues Julie and Steven discussed would not be appropriate when teaching another activity.

Steven’s cooperating teacher had taught archery each of the seven preceding years and as a result, was able to provide Steven with some knowledge of instructional strategies that were specific to the teaching of archery. For example, Steven initially identified the fact that his students were chatty as a potential problem and he was unsure of how that would affect them listening to, and following his commands. When asked how he planned to overcome this potential problem, he responded by saying “I haven’t come up with a solution yet” (initial interview, p. 7). His cooperating teacher offered him the following advice,

One way to address the chattiness is on the first day you have them, tell them the routine. When you say ‘bows up’ or when someone says ‘bows up’, that means that the range is open and everybody in the class has to be quiet until they hear the command ‘bows down’. And really be consistent with that and I think you could
really eliminate a lot of the background noise. I always think ‘bows up’ and ‘bows down’ are overall class commands not to be used just when shooting. For example, you want them all starting at the same time and not retrieving until everybody’s done. So if you, or student helpers say it nice and loudly at the beginning and you explain to the students that’s when the range is open and everybody has to be quiet and enforce it, then I think that will alleviate that problem (initial interview, p. 8).

Safety, specifically related to the teaching of archery, was a topic that was discussed throughout the entire unit. Steven’s cooperating teacher continuously asked about, reinforced, and provided information relative to safety. During the initial interview, Steven’s cooperating teacher reinforced three times that ‘bows up and bows down’ should be used as an overall class command to begin and end activity and between those two commands, all students should be quiet and concentrating on the task at hand. She continued by stating that whenever Steven felt that the students were behaving in an unsafe manner, that he should give the ‘bows down’ command immediately to stop the undesired behavior and redirect the class. During a post-lesson conference between Steven and his cooperating teacher, Steven was reading Julie’s observation notes and responded by saying, “I did a little safety” to which Julie responded, “you didn’t really” and to which Steven countered with “you want me to do a complete review each time?” (cooperating teacher and student teacher post lesson conference, May 10, p. 1). In response to Steven’s question, Julie stated,

I’m just personally concerned about it especially on a Monday after they’ve been gone for a couple of days. If we don’t spend a little bit of time reviewing safety, some of them are going to forget, especially for someone who has not been here (student teacher - cooperating teacher post lesson conference, May 10, p. 1).

A safety discussion similar to the one mentioned above also took place during the post lesson conferences of May 17, (pp. 1 & 6).
The routine and commands ‘bows up and bows down’ are overall class commands used specifically during an archery unit to maintain student attention and for safety reasons. One would not expect students to be quiet in a basketball unit for example, if the teacher stated, ‘bows up and bows down’. In other units, a whistle blow or the commands “quiet”, “ready, go”, and “stop” would be appropriate in a number of activity units to gain student’s attention and begin and end activity. With archery, a routine and commands specific to the unit are required for safety reasons and to maintain student attention and begin and end activity. For these reasons, the information previously suggested above by Julie is considered information relative to an instructional strategy specifically related to the teaching of archery as opposed to knowledge about classroom management in general.

Another instructional strategy that Julie, Steven’s cooperating teacher provided him with specific to the teaching of archery, concerned the amount of material that would be sufficient for the unit and a single class. Initially as Steven was planning the unit, he was concerned about not having enough material to cover in a five-week unit that wouldn’t result in student boredom. However, after discussing his concerns with Julie, Julie assured him he had more than enough. According to Steven,

From what Julie says, shooting an end of arrows takes about 10 minutes. If there are three students in the group, and each student shoots three arrows, that will take about 30 minutes for each group member to shoot one end. So according to Julie, I may even have too much scheduled in my block plan if it really does take that long to shoot an end of arrows. Looking at my block plan, I don’t think that I have that much, but she says I’ll be ok (initial interview, p. 7).

Julie provided additional information to Steven to further explain why it would take 10 minutes to complete one end. She stated,
The big thing that takes archery so long is that you can’t have one group working at one pace and another group working at another pace. That’s why it may take 10 to 20 minutes to run an end. Some people are scared. They will hold the bow out here (demonstrates holding an imaginary bow out in front with straight arms). They don’t want it close to them. It takes them a while to let go of the arrow (initial interview, p. 8).

Steven found the information relevant as it assisted him in the planning process. Initially Steven was worried he did not have enough content to fill a 5 week unit. Julie’s assurance that he did, relieved some of the pressures Steven was feeling.

Another instructional strategy related specifically to the teaching of archery that Steven received knowledge about concerned his movement throughout the activity area. Steven had explained that in a previous elementary methods class he learnt about the importance of moving throughout the activity and how it wasn’t considered effective practice to stand in one place. This teacher behavior was reinforced when he completed his elementary teaching practicum by both his cooperating teacher and university supervisor. During the first few archery classes, Steven began to move throughout the activity area while the students were shooting an end of arrows. What he did, was move up and down the shooting line, behind the shooters. However, Steven explained that early into the unit during a post lesson conference, (student teacher – cooperating teacher post lesson conference, May 17, p. 5) Julie had brought up his movement patterns during the course of the conference. According to Steven,

Julie suggested I shouldn’t be moving up and down the line when they are shooting. I should be standing at the end so I can scan across the whole line and see everyone. Before, when I moved up and down the line, I would have my back to half the students (May 26, p. 10).
Steven stated he found this information to be quite relevant as “when I thought about it, it just made sense” (May 26, p. 10).

During the initial interview, Steven had stated that his knowledge of students’ understanding of archery was that they perceived archery as just shooting and in an attempt to address these student misrepresentations he was going to include an initial activity that had students shooting at the very beginning of class. His lesson plans often indicated the class would begin by having students shoot a few ends of arrows or ended with a competition where students kept scores and recorded their scores on a team score sheet. However, he often he didn’t follow through with these aspects of the lesson plan. He stated his reason for often skipping the initial few ends at the beginning of class was because he wanted to make sure that “I had enough time after [my instruction] for them to get plenty [practice] repetitions in, shooting the proper way” (May 26, p. 13). The lesson ending competitions that were included for students to apply the day’s lesson were often skipped because “I just don’t think I got that far on a lot of those lessons” (final interview, p. 2). Through conversation, Steven explained that he was really concerned about the students having enough practice time and that competitions took away from student practice time. Julie explained to Steven,

You can look at practice time as competition too. You have to get them to buy into that and get them to keep track of all their stats for everything, not just during tournament activities. They need to understand there is a practice competition going on. The idea would be that a competition/practice was taking place and once they saw that they really didn’t do well or they needed to improve, they may approach class more motivated to practice, especially if you give them a chance to improve at the end. …You have to make things into competition. We tend to think of practice as just practice, but if you think of it in terms of how to keep track of some kind of stats, then they would buy into it more and be more interested (final interview, p. 3).
Steven found this to be relevant as he stated that if he were ever to teach archery again, he would begin and end with some form of competition and he would also consider,

Having a competition, similar to the one I had at the end of the unit, have one in the middle. I would then do some more instruction and then have a final competition at the end of the unit so they understood what the tournament was going to be like at the end (final interview, p. 4).

From very early in the archery unit feedback was something Steven was conscious about and working on. He and his university supervisor discussed the provision of feedback during his archery lessons throughout the unit. For example, in a reflection he wrote to his university supervisor, he stated, “I am looking to improve my feedback next week AGAIN. I am still having problems opening my mouth and saying something.......anything!” (Lesson reflection one from Steven to his university supervisor, May 7). In summarizing her observations from a visit dated May 12th, his university supervisor indicated that a behavior that she wished to see Steven improve upon was the “use of positive specific skill feedback and positive corrective feedback” (university supervisor observation summary sheet, May 12). The following week, on a lesson observation summary, the university supervisor indicated that the “use of positive specific skill related feedback relative to teaching cues of the day” was a behavior she would like to see improved (university supervisor’s summary of lesson observation, May 18).

Steven’s ability to provide feedback during his archery lessons was a teaching behavior Steven and is cooperating teacher also discussed a number of times. During a
post lesson conference following Steven’s third archery lesson, Julie began to discuss the fact that she wasn’t hearing Steven’s voice enough during the class. He stated it may be the result of a problem he was having. More specifically he stated, “I’m having a problem I don’t know how to deal with. If I say someone’s name, they always turn towards me with their arrows” (student teacher - cooperating teacher post lesson conference, May 10, p. 4). Julie proceeded to discuss with him how he could overcome this problem while still providing feedback to students, namely through the use of feedback across space, and then she provided some specific examples. The following week, the two again discussed Steven’s use of feedback and although Julie said she thought it was improving, she stated “a lot of stuff was general, just ‘good job’, ‘nice shot’” to which Steven responded, “same thing as usual” (student teacher - cooperating teacher post lesson conference, May 17, p. 1). At the end of the post lesson conference of May 17, Julie asked Steven what she wanted him to look for during the next archery lesson in third block and he responded with “feedback”. Julie did code his feedback statements and after looking at and discussing the coding sheets Julie had completed, she summed up the conversation by saying,

And with your feedback, you’re certainly interacting with [the students] frequently, it’s just a matter of the ratio of who you’re interacting with and for what reasons. But, you’re certainly much more vocal than you’ve been and you’re getting much better with giving feedback. So things are looking fine. First block was much better than it was the other day. Your feedback across space is getting better. ...So I think we’re moving to where we need to move. It’s just a matter of toughing it out the last few weeks and keeping everybody safe (student teacher - cooperating teacher post lesson interview, May 19, p. 8).

Another form of feedback, namely providing feedback across space, was another instructional strategy Julie addressed with Steven. Here, Julie discussed the provision of
such feedback specifically as it related to using such feedback in his archery unit. Early in the unit, Julie told Steven she would like him to focus on scanning the activity area more. She stated, “...you rarely look up to see what’s going on”. Steven was aware of the importance of providing feedback across space as it was a teacher behavior that he had worked on with his cooperating teacher and university supervisor when he had completed his elementary internship the previous quarter. Over the course of his elementary internship, Steven was able to demonstrate his ability to provide feedback across space. During his secondary internship, it appeared that delivering such feedback was a skill that he had to re-learn. As he stated, “I had a big problem with that last quarter too, so it’s relearning that. It’s harder than I thought it would be to transfer those skills to these older students” (student teacher – cooperating teacher post lesson interview, May 10, p. 2). Julie provided Steven with an example of when he provided feedback across space effectively and suggested how he could incorporate more of it. She stated,

When you were walking out to get arrows in third block, you turned back to look and saw someone with an arrow up. You simply told them to put it down. That’s all it takes is a second to look here and there, even when you’re busy working with one person or a small group (student teacher – cooperating teacher post lesson interview, May 10, p. 2).

Steven assumed Julie was suggesting he provide feedback across space to a specific person and he wasn’t completely sure of how to effectively do this. To clarify, Julie suggested that,

You can give feedback across space to no one specifically. You don’t have to call out a name. You can simply say to the whole group, ‘remember to keep that odd color feather up’, or ‘remember, take your index finger off before you shoot’ (student teacher – cooperating teacher post lesson interview, May 10, p. 4).
Steven’s response to Julie’s comments was “yeah, that’s true” (student teacher – cooperating teacher post lesson interview, May 10, p. 2). However, a week later, Julie once again brought the importance of scanning. During a conference with Steven during the last period of the day when they were discussing the day’s lessons, she stated,

A little concern for me today was your scanning. I didn’t see a lot of it. And the reason I say that is because there was a lot of fooling around today a lot of things that made me feel somewhat uncomfortable. Some kids were throwing the arrows, some kids were running out to get the arrows, and some kids were pushing each other behind the line (student teacher – cooperating teacher post lesson interview, May 17, p. 5).

Steven responded with, “I never saw that” and Julie continued with “If you looked up more often, and scanned a little bit, it would be a little easier for you to see that stuff” (student teacher – cooperating teacher post lesson interview, May 17, p. 5).

The knowledge Steven receive with regard to instructional strategies for archery included establishing the routine and use of ‘bows up and bows down’ as an overall class command to begin and end activity, how much material could be realistically covered in a class, movement throughout the activity area, the use of student competitions as a form of practice, providing feedback both individually and across space, and scanning the activity area. Julie was the source of this knowledge and Steven found the information Julie provided useful.

Knowledge of Context

Knowledge of context includes the four components labeled, students, community, district, and school. This knowledge area was discussed at the beginning of this case. The information provided previously was information that pertained to both
units under study. Here, information will be provided that pertains specifically to the unfamiliar archery unit. With respect to the archery unit, the participant discussed the “students” components only. Steven did not provide information that supported he acquired knowledge about the school, community, or the district specifically related to archery.

Knowledge of Context: Students

In preparing to teach archery, Steven did seek out information about how the students would respond specifically to archery. This information was gathered by asking his cooperating teacher and another physical education teacher who worked at the school. From these two sources, Steven discovered that, “From what Donnis and Julie say, they love archery. I just haven’t seen them with a bow and arrow in front of them before, so I don’t know how they’ll buy into it” (initial interview, p. 5).

Although two of the teachers at the school both informed Steven that the students would, in fact, enjoy archery, Steven wasn’t convinced. As he stated, “From what they say [other teachers], they’re [the students] very motivated by it [archery] but they don’t like badminton, and I don’t see how they get more out of archery than they do out of badminton” (initial interview, p. 5).

In response to Steven’s initial doubts, his cooperating teacher provided him with some more information about the students. She stated,

They [students] do enjoy archery. I can say that after seven years. If I’d only taught it for a year, I’d say, well maybe some would enjoy it, but I know after seven years, my kids have all liked archery. They’re going to be excited about it and if you go at it that way, then we’ll get a lot farther with them. They can do a lot and they’ll enjoy it a lot. And one of the things that is a little easier for them with archery is that it’s not such an active activity. With badminton you have to
run around the court. With archery, it’s not as much [running], so you attract a
different group of people or maybe you’ll attract more, those kids who don’t want
to exert themselves (initial interview, p. 6).

The information provided by Steven’s cooperating teacher about the students
would prove to hold true. During the first week of archery, Steven provided the
following reflection to his university supervisor,

The students like archery more than I gave them credit for. They like it, I think,
because it is something that is new for them. The ones that have shot before are
happy to show their skills and to help their peers. It is their turn to shine. It is
funny to watch the students who are the athletes that are having problems in
archery get help from the non-athletes who are experienced shooters! They are
eating it up (from reflection 1, May 7).

Once the unit was over, Steven was asked what he learnt about his students over
the course of his archery unit. Steven responded that he was surprised at “how interested
they were in competitions against each other” (final interview, p. 3). This information
was gained through the experience of just having taught the archery unit and listening to
his students’ comments about the final unit competition. His perceptions were reinforced
by Julie, his cooperating teacher who stated, “They’d get into 90 minutes of competition
if you let them” (final interview, p. 3). Steven found this information to be quite relevant
as he stated that if he ever had to teach archery again, he would,

Start with competitions every day to motivate them. I don’t know if they would
continue to participate after the competition was over or whether or not their
participation would decline, but it would be worth a try. I would try it to see if I
could get more participation throughout the whole unit (final interview, p. 2).

R.Q.2. What Are the Enacted Effects of Knowledge Acquisition on the Student
Teacher and/or Students When Teaching Content Perceived to be Unfamiliar?
Unfocused Observations

When Steven was teaching archery, he appeared to be erratic with respect to having focused observations. That is, there were many times where it appeared that he was looking up and down the shooting line, observing student performance. During these times, there was a lot of silence on his part. To some extent, this would make sense as he was instructed to stand on one end of the shooting line, scan the line, and observe for students who were having difficulty (May 26, p.10). In viewing the tapes, Steven can often been seen standing on the end of the shooting line, and looking down the line.

During a video recall session with Steven, I asked him what he was doing and thinking about while he was standing there. He responded with,

A lot of the time, I’m thinking about how to get those who aren’t participating to participate. Maybe, what the students who are participating need to know in order to do better. But to be honest, a lot of the time, ‘when am I am going to end this lesson?’ (May 26, p. 11).

The result of not having focused observations was that he often missed opportunities to provide feedback to students on how the students could improve their performance. Several instances can be seen on the video-tapes where bows were falling within a foot or two of the shooter, or the target was grossly over or under shot and Steven made no effort to approach the student and offer feedback. Steven’s response to such instances, when they were brought to his attention, was that he didn’t see it.

However, there were three instances when Steven was observed standing on the line, observing the students, and following their performance he would stop the class and question them. One day in particular, Steven stopped the class and said, “I’m noticing a lot of you are missing the target either right above the target or on the ground in front of
the target. How can we fix this?” (May 7, videotape). On Steven’s ‘Archery 2 Lesson Plan’, the following is written, “I see that a lot of people are missing the target either right above the target or on the ground in front of the target. How can we fix this?” (Archery 2 Lesson Plan). This occurred again when Steven introduced cloud shooting (May 19 & 21). In both instances, Steven did observe that students were having difficulty and attempted to provide instruction to help students improve. When questioned about whether he actually saw students having difficulty or whether he stopped the class and made the statement because he planned to cover that particular concept, he stated,

I was prepared to see it. I was looking specifically for it. From the previous day’s experience I knew they were going to do the same thing they did the other day which was shoot straight up instead of across and aim straight up and not worry about where on the ground they were aiming for (May 26, p. 13).

I then asked Steven if he felt he was able to accurately observe students and present a similar question based on his observations, when he didn’t have a preplanned question in his lesson. He responded, “probably not” (researcher field notes, May 21).

Feeling Uncomfortable

Another effect on students when Steven was not familiar with the content he was teaching was that he was not comfortable teaching and this in itself lead to a number of other problems. Researcher field notes written when viewing his lessons and again when watching the videotapes indicated there was evidence (looked uptight, not saying much, looking a lot at his lesson plan) that Steven was not comfortable teaching archery (field notes from May 5, 10, & 14). Steven himself acknowledged that he was uncomfortable with the content of archery on his mid term self-assessment. About himself he wrote,
“By becoming more comfortable in the setting and with the material, I will be able to give better instructions and more cues to increase the likelihood of student understanding” (student mid term self assessment, May 12).

Near the end of the unit, Steven was still not feeling comfortable teaching archery. During a post lesson interview conducted near the end of the unit he stated, “it’s [archery] a different setting. I haven’t been able to get comfortable” (post lesson interview, May 26, p. 9). His cooperating teacher agreed. During the final interview, his cooperating teacher stated that she felt the biggest difference between Steven’s archery and fitness units was that “I think he just felt more comfortable with his fitness unit. Speaking as someone who was watching him and observing him, I got the sense of that he was more comfortable with it, the fitness” (final interview, p. 14).

According to his cooperating teacher, the effects of feeling comfortable or uncomfortable with the content were,

I think he enjoyed it [fitness] more and in turn some of the students became fairly enthusiastic about it. With archery, he never brought that enthusiasm to the table. I think with frisbee golf it was evident, you started to have some fun and enjoy what you were doing. The kids really started to enjoy it too (final interview, p. 14).

Julie felt that Steven’s feelings of discomfort with the content of archery affected student participation. She stated,

I think more [students] participated in fitness than in archery. There were some kids in archery who participated but the level of participation was very low. For example maybe they shot only once during the class period. With fitness, once you got them going, they were going most of the time. There were two, maybe three people that sat out during fitness. In archery they seemed to sit out more (final interview, p. 14).
Steven’s discomfort with the content influenced the way he approached the content and delivered it to students. Steven started out very skeptical; he didn’t believe the students would enjoy archery when they didn’t appear to like any other activity they had been exposed to thus far. Before the unit even started, his cooperating teacher told him that if he got excited about the content, so would the students. In a journal entry early in the unit, Steven indicated that he was surprised to see that the students were actually enjoying themselves. However, he was unable to maintain the students’ interest. As the unit progressed, several times during the middle of the lesson, students often indicated that they were bored. In discussing this, Steven acknowledged and took responsibility for this. In his words,

Sometimes I think that it’s probably my fault that they’re getting bored in archery. I don’t sell archery lessons as well as others might. I’m not as excited about it and I think that if somebody else was excited about it they could take the same lessons and they’d be able to keep their attention longer (interview, May 26, p. 5).

His inability to demonstrate to the students that he was excited about the unit was reflected in the students’ attitudes towards the unit. This created a cycle, which perpetuated itself, making the unit extremely difficult for Steven to teach.

Once his internship was nearing the end and he had finished teaching both units, he reflected back over what he had learned during the past 10 weeks. According to Steven, what stood out most after watching a videotape of himself teaching archery was realizing that his cooperating teacher was right when she said he lacked enthusiasm and it affected each lesson and unit. In answering the question regarding what stood out the most, he replied,
Not having emotions, just going out there, just talking monotone, actually being boring is what is amounted to. That was brought to my attention and when I watched it on videotape, it really hit home. That’s by far one of the biggest lessons I learned this whole time. I may not like archery, but either way, I sure as hell have to sell it to the students (final interview, p. 13).

In an interview with Steven’s cooperating teacher near the end of the internship, she was asked if she noticed any differences when Steven was teaching one unit as compared to the other. She stated that although the difference wasn’t huge “he just doesn’t look like he’s as comfortable doing what he’s doing in archery” (final interview with the cooperating teacher, p. 1).

R.Q.3. During a Secondary Physical Education Teaching Internship,

What are the Types, Sources, and Perceived Relevance of Knowledge Acquisition When Teaching Content Perceived to be Familiar?

Subject Matter Knowledge

The general area of subject matter knowledge includes three components. These are content knowledge, and knowledge about the syntactic structures and substantive structures of the discipline. Content knowledge and substantive structures are the components of subject matter knowledge that will be discussed. There is no evidence to suggest that Steven acquired knowledge about the syntactic structures of the discipline.

Subject Matter Knowledge: Content Knowledge

Although Steven had a strong theoretical and practical background in fitness, he still consulted a number of sources to help himself plan his fitness unit. Prior to actually putting together his fitness unit, he

gathered together a lot of resources from professors about fitness education and fitness games and went to PE Central (http://www.pe.central.vt.edu/) and other
sites on the web and got fitness games. For the cognitive stuff (knowing the difference between, and being able to provide examples of, aerobic and anaerobic exercise, and being able to take their heart rate), I used the personal training manuals that I had and got some norms and some terms from the manuals (initial interview, p. 11).

Although he did gather a number of resources, when he reflected on the unit as whole after he completed teaching the unit, he stated,

I don’t think there’s any information that I didn’t have access to. I probably could have used the information that I had a little better. I think I relied more on my own personal knowledge and the resources that I had” (final interview, p. 10).

Although he didn’t use all the information he gathered, in some way Steven felt most of the information he gathered was useful because, due to his background knowledge in the area, he felt he was able to be “a lot more discriminating” (interview May 26th, p. 7) when he went through the material. As a result, he was able to “take an activity or two from this book, one or two activities from this book and put things together that way” (interview May 26th, p. 7).

Subject Matter Knowledge: Substantive Structures

When Steven taught fitness it would appear from the information gathered that he had adopted a combination of the academic and technological orientations. Rink (1993) described the emphasis of the academic orientation in physical education as focused on “games, sports, dance and fitness” (p. 15), and the emphasis on the technological orientation in physical education as focused on “…research based teaching skill development” (p. 315). Steven discussed various fitness concepts like aerobic fitness, anaerobic fitness, heart rate, repetitions, and sets with his students and had students complete a number of written activities related to the concepts. He also demonstrated the
concepts by having students physically participate in a number of activities. Since most of Steven’s feedback from both his cooperating teacher and university supervised focused on his archery lessons, there is little information available about the teaching of his fitness unit. However, when he discussed his ability to deliver feedback and interact with students, he commented how much easier it was for him during his fitness unit. From the conversations he regularly had with his cooperating teacher and university supervisor following his archery lessons, he was aware of the necessity of being able to demonstrate various teaching behaviors during his teaching episodes and felt he was able to demonstrate such behaviors during his fitness unit.

General Pedagogical Knowledge

The general pedagogical knowledge area contains four components. These include the individual’s knowledge and beliefs about learning and learners; knowledge of general principles of instruction; knowledge and skills related to classroom management; and knowledge and beliefs about the aims and purposes of education (Grossman, 1990, p. 6). Classroom management is the only component the participant discussed. There was no evidence found during the duration of this study, that Steven acquired information relative to the other three components.

General Pedagogical Knowledge: Classroom Management

The classroom management component includes such practices as establishing a routine and outlining the rules that will govern how the class is run. Other tasks such as entering the gym, taking roll, transitioning, organizing for instruction, regrouping, getting equipment out and away, staying on task, obeying rules for behavior and class closure are
examples of frequently recurring managerial tasks in physical education (Siedentop & Tannehill, 2000).

In consultation with his cooperating teacher, Steven’s routine for fitness was similar to what Julie had explained she had been doing with the students prior to Steven’s arrival in the school. This routine was such that after changing, the students met in the gymnasium. Once attendance was complete, he provided students with an outline of the class. The class began with a 20-minute warm-up. Here, the students had a choice. Steven always provided a game as a warm-up, for example, cardio soccer, cardio flag football, cone game, stations on the track, ultimate Frisbee, team handball, and jump rope, are all listed as warm-ups on his unit block plan. Also listed as an alternative for those not wanting to participate in the game was a ‘walk-run for 20-minute’ option. Following the warm-up, the students moved from the gymnasium or track into the weight room where students were instructed to lift weights for 25 minutes. When lifting weights, “students [were] expected to complete the “Lifting Log”. To complete this, the students must do 2 sets of 10-12 repetitions for 2 different exercises for each muscle group on the Log” (fitness unit plan, p.4). The class was initially planned in a manner that had half the class lifting while the other half played basketball and then the two groups were to switch. For space, supervision, and behavioral reasons this was not possible so the whole class participated in the weight room activities at the same time. Often times, time at the end of the class was spent allowing those students that wanted, to play basketball. Those not wishing to play basketball, sat on the sideline. There were days when playing basketball was not an option and on these days, the class time
(approximately 90 minutes in total) was divided between an extended warm-up and extended lifting time.

After observing a number of fitness and basketball classes, I asked Steven why he often allowed the students to play basketball for 10 to 15 minutes at the end of class. His response during the fitness unit was the same as it was during the archery unit. He said it was a way to gain compliance, that “it’s a reward”. Sometimes, depending on their behavior, we don’t let them play basketball and they ask why and we tell them” (post lesson interview, May 26, p. 4). When asked whether it worked, he stated, “sometimes, for brief periods of time it works. It will work for that day, the next day, or two days after. But after that it wears off and we have to do it again if we want compliance (post lesson interview, May 26, p. 4).

Allowing the students to play basketball for compliance was something Julie had suggested to Steven. She too, had used basketball as a reward for student compliance in previous units. Steven found this a useful tool as he said it worked and he used the reward during both his archery and fitness units.

Steven’s classroom management strategies included maintaining the routine Julie had previously set, introducing a lifting log for students to record their work, and using basketball as a reward for compliance.

*Pedagogical Content Knowledge*

Four components are included in the pedagogical content knowledge area. These are, knowledge and beliefs about the purposes for teaching a subject at different grade levels, knowledge of students’ understanding, conceptions, and misconceptions of
particular topics in a subject matter, curricular knowledge, and knowledge of instructional strategies and representations for teaching particular topics. Data is available for the conceptions of the purposes for teaching subject matter and the knowledge of student understanding components. There was no evidence to suggest that Steven acquired curricular knowledge or knowledge of instructional strategies and representations.

*Pedagogical Content Knowledge: Conceptions of the Purposes for Teaching Subject Matter*

This component of pedagogical content knowledge includes “knowledge and beliefs about the purposes for teaching a subject at different grade levels” which are “reflected in teachers’ goals for teaching particular subject matter” (Grossman, 1999, p. 8). The purpose of his fitness unit, as stated in his unit plan, was “to allow student to be able to participate in fitness activities that give cardiovascular or strength workouts and are more motivating and less threatening to the situation” (Fitness unit plan, p. 6). Through discussions, Steven stated the main goal he hoped to achieve was to change his students’ existing preconceptions of what fitness was all about (see below).

*Pedagogical Content Knowledge: Knowledge of Student Understanding*

Knowledge of student understanding refers to a teacher being cognizant of the conceptions or misconceptions that students may have about a particular topic. As part of his internship and teaching responsibilities, Steven was required to complete a unit plan for the units he was to teach. A ‘needs assessment’ was required to be included in the
unit plan. Based on informal discussions with students and his past experiences working in the fitness industry, Steven wrote the following needs assessment for his fitness unit,

Very few of the students at Riverdale are motivated by the terms exercise, fitness or working out. ... The students also have a warped perception of what weightlifting does for their bodies. The young men think that they will all turn out to be on the cover of Muscle Magazine and the young women are so scared of becoming too big that they are not willing to work hard in the weight room.... (fitness unit plan, Needs Assessment, p. 1).

During the initial interview, Steven was asked his perception of the students’ prior knowledge and experience with fitness and how this affected his planning. First, it was his belief that society and students today had warped perceptions about fitness and what it took to get fit. From his experiences as a personal trainer and from conversations with friends, he found he often engaged in discussions that included,

questions about not being able to motivate themselves to do the hard work, to work out six days a week for 2 hours a day. Most people say they don’t have that time or they can’t motivate themselves to do that. ... That’s society’s view of fitness right now. That it always has to be hard work. A lot of people don’t see that it can be fun. It can be recreational as well as beneficial. (initial interview, p. 10).

His perceptions about students’ misconceptions were echoed by his cooperating teacher. After having taught fitness every year for the past seven years, his cooperating teacher stated that her experiences in the past had led her to the same conclusions.

Knowledge gained from his past experiences proved to be very relevant as it directly impacted how Steven planned and intended to teach his fitness unit. In describing his intentions, he stated,

What I’m trying to do is make fitness an activity that they [students] think is more fun than work. If I can show them how they can use games, like soccer, or
football, or handball, and how to bend the rules to make them into games that improve cardiovascular endurance, then they can play those games without having to go to a gym, or without having to go on a run because these kids don’t want to run. If I can put it in a games context where they’re still getting the same amount of activity and they’re getting their heart rates up in the target heart zone then I think they’re more likely to continue leading an active lifestyle (initial interview, p. 9).

Through personal experiences, Steven was aware of some misconceptions his students were likely to bring with them to class. His perceptions were reinforced by his cooperating teacher. The information Steven had was relevant as he took it into consideration when planning.

*Pedagogical Content Knowledge: Curricular Knowledge*

Included as part of curricular knowledge is knowledge about the horizontal and vertical curricula for a subject. During the final interview, Steven was asked what he would do the following year if he had to teach fitness to the same group of students, that is, students who had already completed the current fitness unit with him. Without hesitation he answered,

Starting with a higher group, the next place I’d go is to have them design their own fitness program. The fitness program would have to be more applicable to their life. They would have to use equipment that they have access to, for example, stairs, the sidewalk, furniture or fences. It would have to be personal to their needs, for example, losing weight, toning up, or building bulk. That would take a lot of time because you would have to teach to each person’s individual needs (final interview, p. 10).

Also included in the curricular knowledge category is knowledge about curricular materials available for teaching the subject. As discussed previously (content knowledge), Steven stated he felt he had access to all the information he needed and further stated that such knowledge came from resources he had collected through
previous course work or experiences. He also stated he felt he didn’t use the resources as well as he could have. When asked to be more specific and describe how he could have used some resources better, he stated,

I didn’t use people at all. I could have had tri-athletes or distance runners come in and explain a little bit about their training strategies. Or, I could have had disease survivors come in and discuss how fitness has affected their lives. There are a countless number of ways you can incorporate fitness with guest speakers. If day trips were allowed, I would have liked to take the class on a few of those (final interview, p. 11).

With respect to curricular knowledge, Steven appeared to have an understanding of the vertical curriculum when teaching fitness as he was able to discuss ways in which he could extend the fitness course. He was also aware of curricular materials, more specifically the use of people, who could be used to teach the subject.

*Pedagogical Content Knowledge: Knowledge of Instructional Strategies and Representations*

Steven was able to provide appropriate feedback during his fitness units. Whereas conversations related to providing feedback in archery were common during end of the day conferences, there is a notable absence of such conversations related to Steven’s fitness units. The only mention of feedback during his fitness unit came from observation notes taken by his university supervisor.

During one of her initial visits to observe a fitness lesson, Steven’s university supervisor indicated that she would like to see an increase in skill related feedback during his fitness lessons (university supervisor evaluation, May 3rd). There was no concrete data to indicate the amount and types of feedback offered during the class observed. However, during a lesson that took place on May 11th, Steven’s university supervisor
coded his feedback statements and her feedback sheets indicated that Steven had
provided a total of 41 skill related feedback statements (either positive or corrective), 0
nasty or negative feedback statements and 12 feedback statements related to students’
behavior (either positive or corrective) (university supervisor feedback coding sheet, May
11th). For the observed day, Steven provided on average, about one feedback statement
every minute, which is considered appropriate. University supervisor observation notes
from the fitness class observed indicated that Steven had “watched students after
providing corrective feedback and provided either more cues, reinforces with, or gives,
nonverbal cues” (university supervisor observation notes, May 11th). On her summary
report to Steven about the lesson, the university supervisor indicated the aforementioned
behavior was one she wished him to continue. On a midterm evaluation, the university
supervisor wrote, “Steven’s knowledge of weight training has been apparent and noted
through appropriate specific corrective feedback. Needs to address skill related feedback
relative to CV fitness” (university supervisor’s midterm evaluation, May 12).

Steven and his cooperating teacher often recorded their end of the day
conferences where they discussed the day’s lessons. The majority of these discussions
focused on archery, with very little conversation directed at his fitness units. It was
during these discussions that Julie and Steven often discussed the amount and type of
feedback he was providing during his archery units. There were no recorded discussions
where the provision of feedback during fitness lessons was discussed during these
conversations.
R.Q.4. What are the Enacted Effects of Knowledge Acquisition on the Student Teacher and/or Students When Teaching Content Perceived to be Familiar?

The effect Steven’s knowledge of fitness had on his students was the delivery of feedback. Steven felt that when he delivered feedback in fitness it was “much more direct and specific in fitness” and that over the course of the unit the feedback he did provide had “either stayed the same or gone up”. He attributed his ability to deliver what he saw as more and better feedback as the result of “getting more comfortable with the students. I can relate to the students better and I’ve found a way to deal with most of the students, either joking or saying something to the students about technique that they are doing wrong” (post lesson interview, May 26, p. 9).

Focused Observations

When Steven was teaching content that he perceived was familiar to him, after he had given an explanation or demonstration and sent the students off to practice, his observations of student performance were focused. During a video recall session, Steven was shown a video clip from a fitness class. On the videotape he had just given a demonstration of a resistance exercise using a towel. Following the demonstration, he walked around the room, observed students, and answered questions if they were asked, but wasn’t saying much on the tape. I asked him what he was observing for, or what he was thinking about during those periods of silence. He responded by saying, “making sure they are going through the full range of motion and if they’re not, I’ll correct it” (video recall session conducted May 11, p. 2)
Two weeks later, during a video recall session, Steven was shown a clip of a class where he was walking slowly throughout the weight room while his students lifted weights. He was not saying anything at the time. I asked Steven what he was looking for when he watched his students. He said, “looking, basically for proper form. Making sure that nobody’s doing anything that’s going to hurt them” and when prompted by the researcher with “so when you give feedback, are you giving feedback on form and safety” he replied, “yes, and speed as well. Most times it’s on speed of repetitions” (May 26, p. 14). As the tape continues, Steven can be seen passing by a student and saying “…slow controlled”.

Feeling Comfortable

Steven was more comfortable interacting with the students and more comfortable in the weight room environment. Over a number of observations, the researcher noticed there were three students, two females and one male, who repeatedly did not participate in either archery or fitness. Not once in archery did Steven approach the students and attempt to encourage them to participate. He asked, “Are you going to shoot today?” and when the response came back negative, he left them alone. During fitness, the same three students sat on a lifting bench and talked while their classmates took turns lifting weights. One morning, Steven approached the students and began to engage in a conversation with them. At first the conversation was about their weekend, how their jobs were going, and how their other classes were going. Then he asked them why they weren’t lifting and indicated that he would really appreciate if they at least attempted to do something. Steven told them they didn’t have to do the 2 sets of 10-12 repetitions for each muscle.
group, but that he would like them to try maybe one set of exercises for the chest, arms, back and stomach, and legs. The students did not respond. Before turning away, Steven prompted with, “Just try one”. After he turned away, the students were relatively quiet and then two of them, the male and one of the females, walked to the other end of the weight room, sat at the shoulder press machine, and completed one set each. They moved to two other pieces of equipment and took turns completing one set at each station. The next day when I talked to Steven about this he stated, “basically, I’m much more comfortable in the weight room” (post lesson interview, May 26, p. 5).

It wasn’t just the students he felt comfortable interacting with in the weight room. During one of our discussion, we talked about the safety hazards of conducting class in the weight room and how it was easy for students to pull muscles, drop weights and injure themselves, and how some teachers find it overwhelming. Steven shrugged his shoulders and shook his head saying, “yeah it may be a factor for some, but it doesn’t bother me in the least” (post lesson interview, May 26, p. 6).

Overall, the enacted effects of Steven’s familiarity with fitness content included providing more direct and specific feedback, having more focused observations, and feeling much more comfortable.

Chapter Summary

When teaching unfamiliar and familiar units of content, the participants acquired different types of knowledge. During the teaching of unfamiliar units, it appears the participants required more assistance with content, general pedagogical skills, and pedagogical content knowledge. Similar knowledge was acquired by the participants
when teaching familiar units of content, but it appears that in some instances, the information they sought was to supplement existing knowledge. The major sources for the various knowledge types included books, the cooperating teacher, past experiences, the presence of a teaching peer, previous coursework, and the daily experiences of teaching. The participants stated the information they received was useful with Jaimie mentioning that she would have appreciated more knowledge and assistance from her cooperating teacher.

There were obvious differences when participants were teaching unfamiliar and familiar units of content. For Jaimie, when teaching unfamiliar content, she lacked a clear focus which resulted in a number of unrelated drills being provided with no explanation as to how the activities were related to each other or the game of team handball. Also, when teaching unfamiliar content, both participants stated they felt uncomfortable. On the other hand, they stated, and it appeared from the manner in which they interacted with students, that they were more as ease when teaching familiar content.
CHAPTER 5

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this investigation was to examine and describe knowledge development in student teachers during a teaching internship in secondary physical education, when the student teachers were teaching content they perceived was either unfamiliar or familiar. The focus of this investigation was on the types, sources, perceived relevance, and enacted effects of the knowledge student teachers acquired as they learned to teach. To this end, the participants each identified two units of content; one in which they perceived themselves as being unfamiliar with the content and a second unit in which they perceived themselves as being familiar with the content. The major question guiding this study was, what influences the development of pre-service teachers’ pedagogical content knowledge (PCK) during a secondary physical education teaching internship? More specifically this study addressed the following questions:

R.Q.1. During a secondary physical education teaching internship, what are the types, sources, and perceived relevance of knowledge acquisition when teaching content perceived to be unfamiliar?

R.Q.2. What are the enacted effects of knowledge acquisition on the student teacher and/or students when teaching content perceived to be unfamiliar?

R.Q.3. During a secondary physical education teaching internship, what are the
types, sources, and perceived relevance of knowledge acquisition when teaching content perceived to be familiar?

R.Q.4. What are the enacted effects of knowledge acquisition on the student teacher and/or students when teaching content perceived to be familiar?

The results of the two cases investigated will be described in this section, beginning with a discussion about the types of knowledge acquired. This part of the discussion is organized such that each knowledge category, and the subsequent categories included in each category, will be addressed individually. Following this, the sources and relevance of the knowledge acquired will be discussed. Next, the enacted effects will be addressed, conclusions will be presented, and ideas for future research outlined.

Types of Knowledge Acquired

Subject Matter Knowledge

There are three components that comprise a teacher’s subject matter knowledge. These are knowledge of content, the substantive structures of a discipline, and the syntactic structures of a discipline. Content knowledge and substantive knowledge are the two components in which the participants sought or received the most knowledge.

Subject Matter Knowledge: Content Knowledge

Content knowledge was acquired, regardless of whether the participant was familiar or unfamiliar with the content they were teaching. When teaching unfamiliar content, the participants’ limited content knowledge prohibited them from being able to visualize how the content and lessons could be delivered. As a result, the participants sought information that would basically provide them with suggestions about how to
present the content effectively. When teaching familiar content, the participants looked for additional activities they could include in their lessons. With their familiar units, the participants had prior ideas about what they were going to teach and how they were going to teach, but they continued to look for activities that were different from the ones they were already familiar. When they were familiar with the content prior to seeking additional information, the participants reported that they were more able to discriminate between relevant and irrelevant aspect of the content provided in the resources.

When teaching both units, the participants spent a considerable amount of time searching for content knowledge to teach their units. According to Siedentop (1989), in undergraduate physical education programs more courses are devoted to the history of sport, the biomechanics of sport, the psychology of sport, etc., which has lead to a concurrent de-emphasis on the number of required activity courses. However, as Tinning (1992) pointed out, teacher education programs cannot cover all topics necessary to fully prepare every teacher of physical education and programs have had to make decisions about what knowledge/courses to include in programs of teacher education. According to Bain (1990) there is no consensus regarding the nature of the subject matter of physical education and the field continues to struggle to define itself. Research conducted in other subject areas such as mathematics (Ball, 1988), physics (Clement, 1982), and history (Wilson, 1988) have demonstrated that pre-service teachers majoring in their respective subject areas also lack subject matter understanding.

The implications for teacher education are that teacher education programs must ensure that students entering their programs have a minimum number of activity-related
courses. It may serve both the incoming student and the profession better if a number of the activities were varied, with one or two having been studied in depth. For example, instead of taking one basketball, one soccer, one field hockey, and a badminton and volleyball course, perhaps the student could take one invasion game activity (basketball, soccer, or field hockey), one net game (badminton or volleyball) and then take a field sport or an aquatics activity. As the students progress through their undergraduate degree, they can study an activity at an advanced level.

Subject Matter Knowledge: Substantive Structures

Prior to discussing the substantive structures component, the question should be raised regarding the definition of the various conceptual orientations in physical education. To date, Rink (1993) is the only writer to apply Feiman-Nemser’s (1990) general education work to physical education. Perhaps Rink’s (1993) interpretation is not as complete as some academics desire. Since Rink’s (1993) interpretations have been used throughout the document, the following discussion will continue to use those interpretations.

Each conceptual orientation (academic, practical, technological, personal, critical/social) was integrated in the teacher education program in which the participants were enrolled. It appears the participants adopted a combination of the academic and technological orientations, regardless of whether they were teaching unfamiliar or familiar content. This supported Rink’s (1993) statement “that the individual student is likely to adopt one aspect of the program’s orientation more than another” (p. 318). The academic orientation is the most common orientation (Rink, 1993) and it was the
program orientation in the schools in which the participants were teaching. Thus, it is not surprising that the participants continued to adapt such an orientation. With respect to the technological orientation, as beginning teachers, the purpose of the practicum experiences was to help the participants develop teaching skills. To this end, the participants received knowledge from university personnel during course work, and from both their cooperating teachers and university supervisors that was aimed at improving their teaching ability. Furthermore, the majority of texts related to the teaching of sports, games, and fitness activities are written from the both academic and technological orientations (Pangrazi & Darst, 1997; Rink, 2000; Siedentop, Mand, & Taggart, Stillwell & Willgoose, 1997; and Wuest & Lombardo, 1994) so it is not surprising that such orientations were adapted. Although writings that highlight the critical/social orientations are available (Fernandez-Balboa, 1997), Nilges (2000) has pointed out that university students “are very resistant to practices and pedagogies that fall outside their immediate experiences and expectations” (p. 104). Furthermore, concrete examples to implement postmodern principles are limited, making change difficult. For example, Fernandez-Balboa, Barrett, Solomon, and Silverman (1996) describe the critical perspective in physical education as viewing content knowledge “as a means for empowering individuals and reconstructing society in ways that are just and equitable” (p. 55). Discussing what the perspective would look like in practice, the authors suggested, “critically analyzing media portrayals of the body, stereotypical gender roles in physical activity, and unhealthy sport practices (p. 57). Tinning (1995) discussed his attempts at incorporating critical pedagogy into his pre-service teacher preparation
program through the use of ‘critical friends and reflective papers’ and concluded that he was not sure that his efforts had any effect. Also, from Fernandez-Balboa et al.’s description, it appears that critical perspectives require more talk and discussion as opposed to movement. This perspective is in sharp contrast to how students, teachers, and the larger community traditionally view physical education. As a result, pre-service or neophyte teachers are likely to be met with resistance when attempting to implement such programs. For alternative orientations to be applied, more concrete practical examples must be provided and sites must be available for student teachers to observe and practice implementing alternative ideas.

Another possible reason why the academic and technical orientations may have been utilized is that, due to participants’ familiarity with those orientations, it was the easiest orientation to adapt in an effort to survive. At the time of this study, the participants were in the middle of the fourth-quarter of a five-quarter demanding graduate program in teacher education. Both participants had stated they were tired, and anxious for the quarter to be over (post lesson interviews, May 14, 17, 28, 31). It could have been that the technical and academic orientations were the easiest orientations for the participants to function effectively within, as the quarter was nearing an end.

Furthermore, it could also be that the academic and technical orientations were the orientations in which the participants were being held accountable. For example, when reviewing the feedback that was provided to the participants by both their cooperating teachers and university supervisors, the feedback was directed at improving their teaching skills, (technical orientation) or how to better present the sport related
content (academic orientation). If teacher education programs expect pre-service teachers to attempt to deliver programs that reflect the social and critical orientations, then they must begin to hold their students accountable for such work. To do so would require modeling for the pre-service teachers what such programs would like, find sites where students could practice this orientation, and then have the pre-service teacher model the programs. Or, the education program must find existing programs that pre-service teachers can observe, assist, and work within. Also, since there exists a dearth of resources (Nilges, 2000) for assisting teachers who would like to implement such programs, pre-service teachers must be directed to existing resources or assisted in creating new ones.

*General Pedagogical Knowledge*

The general pedagogical knowledge area contains the four components of learners and learning, classroom management, curriculum and instruction, and an ‘other’ category. When teaching both unfamiliar and familiar units, it appears that the two general pedagogical knowledge components discussed at length, were classroom management and curriculum and instruction.

*General Pedagogical Knowledge: Classroom Management*

With respect to classroom management, both participants decided to follow the procedures that had already been established by their cooperating teachers. However, at times, both participants had difficulty enforcing the procedures and routines. This occurred often when the participants were teaching unfamiliar units. For example, Jaimie had difficulty maintaining student attention and Steven had difficulty with participation.
For Jaimie, this may be explained by the fact that she taught her unfamiliar unit of content first and her familiar unit of content second. It could be that by the time she began teaching her familiar unit she was feeling more comfortable teaching; after being in the school for over five weeks the students may have become accustomed to her, and she to them. She indicated that with the passage of time and experience, she was becoming more comfortable in her role as the teacher. However, this explanation does not hold for Steven as he taught both units simultaneously. During a member check, Steven attributed the fact that his fitness classes ran more smoothly because he felt more comfortable with the content.

The concern for classroom management has been documented in the literature. Other research conducted in general education (Fuller, 1969) and physical education (Conkle, 1996; McBride, 1993; Rink, 1996) has shown that classroom management is a concern for novice teachers.

Since classroom management is a concern for the novice teacher, perhaps placing students into schools regularly throughout their teaching training programs, may assist the beginning teachers to feel more comfortable. Since much of the work for creating rules, routines and expectations occurs at the beginning of the school year, it may prove useful to place student teachers in the schools with an experienced teacher who is known to have effective classroom strategies. This initial placement in the schools would occur during the first week students begin school. Prior to the first day, the student teacher would engage in a discussion with the experienced teacher about the topic of how she or he decided on the rules and routines, how they plan to introduce them to students, their
expectations for student behavior, how such expectations are enforced, etc. The student teacher would then be in the schools to specifically observe for such behaviors. By the end of the observation week, if appropriate, the student teacher may even assist the classroom teacher with the implementation of their classroom procedures. This initial observation period in the schools designed for discussing and observing beginning of the year routines, does not have to consist of full-day observations. It could be that the students are in the schools for the first two or three periods a day and back on campus in classes for the latter half of the morning and the rest of the day.

*General Pedagogical Knowledge: Curriculum and Instruction*

Although classroom management was an issue, there was also a concern for keeping students active and providing them with plenty of practice opportunities. Student engagement or academic learning time, is a component of the curriculum and instruction area. Keeping students engaged was stressed during methods courses and was a message that both participants had accepted. Their cooperating teachers were also aware of the importance of student engagement. This was evidenced for both participants, as their cooperating teachers provided information on how the pre-service teachers could increase the amount of practice time students were receiving. The importance of students receiving ample practice time to learn skills has been well documented in the literature (Metzler, 1985; 1989; Rink, 1996; 2000; Siedentop, 1983; Silverman, 1990; Werner & Rink, 1989).

With respect to the development of basic pedagogical skills (for example, keep your back to the wall, circulate throughout the gymnasium, provide clear and simple
explanations and demonstrations, provide feedback, etc.) such skills were discussed
during an elementary methods class the previous term. Furthermore, both participants
spent five weeks teaching in an elementary setting, where they had the opportunity to
practice the pedagogical skills previously mentioned. Not only did they practice the
skills, they received feedback from both their university supervisor and cooperating
teacher (University supervisor field notes from the participants elementary practicum) on
the teaching skills. On their final evaluation sheets for their elementary practicum, the
university supervisor had stated those skills were strengths of both participants.
However, once in the secondary setting, it appears that both Jaimie and Steven were
unable to transfer what they had learned from their elementary setting into the new
setting. For example, during this study, as part of one of Jaimie’s evaluations her
university supervisor wrote that Jaimie needed to work toward improving the following
teaching practices, “firmness with commands, feedback (corrective and specific), clearer
directions (provide demonstrations), and rotate around to all groups” (university
supervisor evaluation form, no date). Likewise, basic pedagogical skills like providing
clear directions, gaining and maintaining student attention, and facing all students when
talking, were skills Steven had mastered in his previous setting. However, these were
teaching behaviors Steven’s university supervisor repeatedly commented that Steven
needed to improve (university field notes, May 3, May 11, and May 12, 1999). Marks
(1991) and Rovegno (1994; 1995a) have stated that context is an inherent element of
pedagogical content knowledge and being able to demonstrate such knowledge in one
context does not necessarily mean the same skills can be demonstrated when the context
changes. Perhaps the same is true of basic pedagogical skills. Maybe demonstrating basic teaching skills in one context, such as an elementary physical education classroom, does not necessarily mean the same skills can expect to be demonstrated in another context, for example a secondary physical education classroom. The likelihood of transfer of skills may be further confounded when other contextual variables are in place, such as urban and suburban schools (Stroot, 1996), or the degree to which teachers understand the content they are teaching (Graber, 1996). The contextual nature of various teaching sites speaks to need to provide pre-service teachers with a variety of teaching placements, including combinations of inner city and suburban, and elementary and secondary sites.

Pedagogical Content Knowledge

Four components are included in the pedagogical content knowledge area. The first is knowledge and beliefs about the purposes for teaching a subject at different grade levels, which are “reflected in teachers’ goals for teaching particular subject matter” (Grossman, 1990, p. 8). Knowledge of students’ understanding, conceptions, and misconceptions of particular topics in a subject matter is the second component of pedagogical content knowledge. In order to generate appropriate explanations and representations, “teachers must have some knowledge about what students already know about a topic and what they are likely to find puzzling” (p. 8). Curricular knowledge is the third component in this knowledge area and “includes knowledge of curriculum materials available for teaching particular subject matter, as well as knowledge about both the horizontal and vertical curricula for a subject” (Grossman, 1990, p. 8). The final
component is knowledge of instructional strategies and representations for teaching particular topics and includes a variety of metaphors, activities, experiments, or explanations that are useful for teaching a particular topic. All four components were discussed by the participants.

*Pedagogical Content Knowledge: Conceptions of the Purposes for Teaching Subject Matter*

Regardless of whether the participants were familiar or unfamiliar with the content, they attempted to state their intended purposes. Interestingly, when teaching their familiar units, both participants appeared to attempt to teach to their intended purposes. For example, when teaching fitness, Steven included a number of games and activities aimed at improving students’ cardiovascular and muscular strength that were different from simply lifting weights and running. More specifically, he played a number of low organized games such as cardio soccer, a game he called ‘the cone game’, another game he referred to as ‘cardio flag’, and rope jumping activities. He also conducted different resistance activities using partners and towels. These activities were presented to demonstrate that fitness could be improved by means other than just lifting weights and running. When teaching track and field, Jaimie was easily able to simplify the softball throw, hurdles, and standing long jump into their component parts and she reinforced the elements while students were practicing. When students were sprinting, she reminded them of the proper starting position and when they were completing longer runs, she reinforced the notion of students pacing themselves so they could complete the run without stopping. When teaching familiar units, it appears that the participants had a
goal in mind, and they were able to select and present activities that were more aligned with their intended goals.

On the other hand, when teaching their unfamiliar units of content, the participants were not able to teach to their initially stated goals and purposes as well as when they were teaching their familiar units of content. In a discussion that followed an observation, when the purposes of a lesson were discussed, the stated purposes changed throughout the conversation indicating that Jaime was not clear in what she had intended to do. When deciding which tasks to present to students, Rink (1996) has stated, “A key question teachers should ask themselves about student tasks is, ‘Will this task develop the objectives I want to develop?’” (p. 175). If the teacher was unclear about the objectives, then the question would be difficult to answer. This appears to be the case with Jaimie. Or perhaps, Jaimie’s lack of content knowledge related to team handball resulted in a misalignment between her goals for the unit and the activities she selected to reach her goals (Romar, 1985). Perhaps for Jaimie, when she was teaching team handball, a major reason for her not teaching to her intended purposes may be that she attempted to cover too much for such a short unit. The goals Jaimie stated included, working together or teamwork, communication, throwing and catching, using support, the creation of space, terminology, strategy, and playing the game.

Steven’s intended outcomes for archery were for students to be able to organize, conduct, compete in, score, and officiate a class tournament. These goals were similar to some of the objectives Siedentop (1994) outlined as objectives for the Sport Education Curriculum Model. Observations of Steven’s classes indicated that the lessons focused
on students as performers; at no time were students directed to organize and participate in a tournament. Tournaments in which students did participate were set up and directed by Steven. Steven asked his students to keep score of various practice sessions and mini competitions he arranged throughout the unit. However, students were only occasionally held accountable for this practice. That is, only sporadically did Steven ask different groups of students if they were keeping score and even more sporadically did he actually check to see that students were actually doing what he asked. There was no evidence that Steven discussed officiating nor did he ever direct students to officiate.

A possible explanation for why Steven may not have been able to carry out the activities he originally intended could be that he was not motivated or excited about teaching archery. Teacher enthusiasm is important, especially at the secondary level (Brophy, 1979). In physical education, Graber (1995) found that to motivate students at the elementary level, pre-service teachers simply had to be enthusiastic and excited in class. However, the same pre-service teachers struggled to find ways to motivate secondary students to participate in classes. This struggle led the pre-service teachers to believe they were unprepared to teach at the secondary level. As Rink (1996) explained, for teachers to be able to carry out various teaching strategies and ideas, the atmosphere must be one where the teacher is able to motivate students to engage in the material. Not being enthused himself, Steven found it difficult to motivate the students. In an effort to help pre-service teachers feel more successful and to help them engage more secondary students in classes, pre-service teachers must be provided with a variety of strategies that have the potential to motivate students.
A further explanation may be that Steven learned to function in what Rovegno (1994) described as the ‘curricular zone of safety’. The combination of Steven’s limited content knowledge, his belief that students would automatically resist any explanation of how to properly execute skills, and his further belief that all students wanted to do was play games, prevented Steven from teaching the content the way he wanted. Instead, Steven acted according to the way he perceived he could best function in his particular situation, which was to deliver what Siedentop and Tannehill (2000) have described as a traditional physical education program.

The discussions that occurred throughout this study focused on the goals for the individual units under investigation. In retrospect, the participants should have been probed about the purposes of teaching physical education as a subject area or the contribution physical education makes to the total education of the child. Although never probed, at no time did participants themselves ever discuss such relationships. This in itself is disturbing because a teacher’s conceptions of the purposes for teaching subject matter “act as a template for teachers’ decision making about what to teach, what text to use, and what to emphasize within a course” (Grossman, 1991, p. 210). Furthermore, the National Association for Sport and Physical Education’s definition of a physically educated person and the subsequent benchmarks and outcomes, had been discussed in the participants’ methods courses. It appears the participants disregarded such discussions when teaching in the field. Without clear purposes, it would appear that lessons and units are planned more to ‘fill time’ than to achieve any predetermined outcome. If physical education is to be regarded as a subject area worthy of a permanent place in the
educational system, then units and lessons must be planned and delivered with the intention of reaching pre-thought out goals.

In an effort to ensure that pre-service teachers are clear on what it is they are trying to achieve within the area of physical education, and how each unit contributes to the overall goals of the field, perhaps pre-service teachers should have to make such connections during the planning process. That is, maybe as part of the required unit plans pre-service teachers are required to complete, a statement must be included that outlines which goal(s) the unit addresses and how the unit contributes to the overall goals of physical education. It may also be worthwhile for teacher educators to explore the conceptions of subject matter held by pre-service teachers. For example, very early in the program, pre-service teachers could answer a series of questions aimed at exploring their conceptions and beliefs of the purposes of physical education. After the pre-service teachers have thoroughly answered the questions individually, then group discussions could follow to clarify any misconceptions and to ensure the students understand the overall purposes of physical education, and how their unit contributes to the overall curricular goals.

*Pedagogical Content Knowledge: Knowledge of Student Understanding*

In order to effectively present content to students, teachers must have an understanding of what students already know about the content, and what they are likely to find puzzling and difficult. This type of information will enable teachers to generate appropriate explanations and representations of the content. It appears that the
participants were better able to consider student understanding and misunderstandings when they were teaching their familiar units of content.

Steven perceived that his students felt archery was ‘simply shooting’ and failed to believe that the students would be motivated by the term archery, despite the fact that his cooperating teacher and another physical education teacher in the school who had both taught archery to similar students in the past, told him otherwise. Based on his previous experience in the school, he believed students would be more accepting of archery if he let them play, and with archery, play meant, participating in an archery contest. Steven did initially take this into consideration by planning to begin each class with a mini archery tournament. However, there were several days when Steven skipped this part of the lesson. When questioned about this, Steven felt that on some days, he needed the class time to complete other activities or he felt they were ‘playing’ too much. In hindsight, Steven suggested that if he had to do it all over again, he would include the beginning contest every day, as he realized the time could actually be used as teaching time.

Julie, Steven’s cooperating teacher, suggested to Steven that students would have problems keeping the arrow on the arrow rest. As previously pointed out, this information proved to hold true throughout the unit. Steven had included pre-shot preparation and shot execution as part of his unit plan and did cover how to shoot on the second day of the unit. However, Julie’s points were not stressed during the lesson nor was the point re-visited when a number of students repeatedly demonstrated they were having problems.
With fitness, Steven’s familiar unit, he was fully aware of the misconceptions held by his students and he used this information when planning his unit and lessons. For example, Steven believed his students thought of fitness as running and working out with heavy weights. In an effort to alter these perceptions, he attempted to deliver fitness lessons where students participated in a number of different fitness activities, and a variety of running and strength training activities. In delivering his lessons, he generally started with a warm-up he thought his students would enjoy and find fun. This often took the form of a game that he introduced, or he modified one they already knew. If straight running was involved, it was interspersed with stops where students were directed to stretch, or choose from a variety of different types of push ups or another type of activity, walk a specific distance, or rest for a specific period of time. These activities were followed by students taking their heart rate, at which point Steven took the opportunity to discuss how they were, in fact, working toward improving their cardiovascular fitness (i.e., May 20). When students strength trained with weights, Steven reinforced that students did not need to lift a maximum amount each time, but rather a medium amount lifted a number of times in a slow and controlled manner with rests in between, was beneficial. Because Steven was fully aware of student misconceptions about fitness, he was able to generate and deliver appropriate activities that began to change students’ initial perceptions about fitness. It also helped to keep more students on task, which further contributed to improving the students’ fitness levels, which was one of Steven’s unit objectives.
With track and field, Jaimie, was fairly certain that her students had some familiarity with the content, but felt that most students perceived track and field to be simply running without knowing how to pace oneself. She also felt that students would prefer to simply run the hurdles instead of listening to explanations of how to properly run the hurdles. She took this information into account when planning as she stated,

"With running events I’m going to work on pacing. For example, when running distances, what would be the best way to run? Should they sprint all the way around, start off fast, or pace themselves and then pick it up at the end? I’m going to start at an intermediate level. I’m going to discuss how they have to pace themselves throughout the run in order to complete the run." (initial interview, p. 4).

With respect to her perceptions that students would not listen to the breakdown of hurdle running, Jaimie explained that to overcome this she planned to include the component parts of the hurdle into various warm up stations that students would complete at the beginning of class. She felt that by doing so, when students were actually running the hurdles, she could simply point out or make reference to activities completed previously in the warm-up.

With respect to team handball, Jaimie was aware of her students’ previous experience. During our initial interview she stated she “assumed that 6th grade to 8th grade students would know how to throw underhand and catch, which are the skills needed to move the ball” (initial interview, p. 5). Furthermore, in the needs assessment Jaimie completed as part of her unit plan, she stated that the concepts of “passing, getting open, receiving passes, and support” would “transfer to team handball” as a result of the students’ prior “participation in other team sports such as soccer, and basketball” (team handball unit plan needs assessment, p. 1). She wrote that this information was gathered
after engaging in informal discussions with students and the cooperating teachers, as well as her own informal observations (unit plan needs assessment, p. 1). Although Jaimie appeared to be aware that her students had experience and knew about passing, getting open, receiving passes, and support, she planned her team handball unit plan and daily lesson plans on those concepts. For example, the first lesson focused on passing to teammates, and passing on the move. The second lesson focused on providing support and getting open. In the final lesson of the unit, Jaimie planned to have students play a modified game (4 versus 4) and record the number of complete passes to a team mate, number of goals scored, and number of fair play points earned or lost. She basically provided activities that reinforced what she believed the students already knew.

According to Ms. Sandrin, who was Jaimie’s cooperating teacher (researcher field notes, May, 7), she and her teaching partner had taught team handball the two previous years so the students in grade 7 would have had one year of team handball already and the students in grade 8 would have had played team handball for the previous two years. Ms. Sandrin also stated that when team handball was taught in previous years, she and her teaching partner Mr. Bedard taught the unit for two weeks instead of one, and they taught more specific skills, such as shooting on goal, and the three-step rule. The passing and catching activities and games that Jaimie was presenting to students were much too easy for the students. Ms. Sandrin also mentioned that when she and her partner taught the unit in the past, they taught different skills to each grade. When Judith taught the unit, she used the same lessons and drills for all three grades.
The result of Jaimie not considering her students’ previous knowledge and experience, was that she presented activities that were developmentally inappropriate. This resulted in a disastrous class on the final day. During her final lesson when students were supposed to be taking part in a tournament and coding each other’s passes, the class was extremely disorganized. Jaimie spent the entire class re-explaining the activity, pointing out boundaries, encouraging teams to play, and breaking up fist-fights.

As this was occurring, I talked with the cooperating teacher and asked her what she thought of the lesson. In her brief comments, Ms. Sandrin indicated that if the game were appropriate to the students’ level of development and ability, Jaimie probably would not be having the problems she was. The simple passing game that Jaimie had the students play had been done many times in the earlier grades during basketball lessons, and was the same game the students had been playing all week. The above examples support research conducted in classroom research, where knowledge of prior student understanding, as well as conceptions and misconceptions of topics is essential for teachers to construct and present effective lessons and tasks for students (Grossman, Wilson, & Shulman, 1989). Knowledge of student understanding, “enables [teachers] to build on skills and strategies as students move from elementary to high school, instead of repeating Volleyball 101 grade after grade” (Griffin, Dodds, & Rovegno, 1996, p.58). Knowledge of student understanding can be enhanced if teachers begin to engage students in discussions regarding how they understand the content and the troubles they encounter with the content. Teachers can also watch how students respond to the given instructions and tasks. Rovegno (1997) termed this, “looking through a learning lens” (p.
A learning lens “directs the teacher to be a researcher of children’s learning” (Rovegno, 1997, p. 160). This type of information has shown to enhance teachers’ instruction (Rovegno, 1997; Walkwitz & Lee, 1992).

One suggested way to help beginning teachers gain more knowledge about student understanding and misunderstandings is to provide the information to them directly. This type of information could easily be included in undergraduate coursework. For example, during activity courses while students learn about the activity, the rules of the activity, the biomechanically efficient manner in which to execute the skills of the activity, they could also be presented with information related to how younger students learn the activity, what aspects of the skill(s) they are likely to find difficult and how to overcome such difficulties. The discussions could also discuss appropriate progressions, possible metaphors to clarify specific movements, like the ‘triangle’ metaphor often used when teaching the proper hand/finger position for the overhead pass in volleyball (Doutis, 1997). Presenting this information is not limited to activity courses. For example, during motor learning courses, when discussing speed versus accuracy or massed versus distributed practice, the instructor could relate the general concepts specifically to the teaching of motor skills. For example, a brief discussion regarding why one would first throw for distance and not accuracy and what is likely to happen to form once accuracy drills are introduced, could occur. Or, other discussions could focus on the varying effects on skill retention that large amounts of condensed practice have versus practice over extended periods of time and relate such information back to how
such information should be taken into account when scheduling physical education classes, units, and lessons.

Also, during teacher preparation programs, teacher educators could teach students how to observe student performance, possibly using some form of observation protocol. After learning the protocol, students could then be shown video-taped clips of children learning motor skills or taking part in activities, in a physical education class. Using the observation protocol, the pre-service teachers could be instructed to observe the video. At a pre-determined point, the instructor could stop the video-tape, and then ask the pre-service teachers what they see and what their observations indicate about the skill (for example, appropriate or too easy or too difficult) and then the discussion could proceed with, ‘what would you do next if you were teaching this class and why?’

*Pedagogical Content Knowledge: Curricular Knowledge*

Previous research (Rovegno, 1992b, 1993, 1997; Sebran, 1995) has demonstrated that when pre-service teachers have difficulty with content, they also have difficulty providing appropriate progressions. Similar results were found with Jaimie and Steven when they were teaching their unfamiliar units of content. During her team handball unit, Jaimie presented students with a series of tasks. She did not connect the tasks to the game of team handball, nor did she explain to the students, how the tasks were related to each other. When discussing progressions, Steven stated he struggled during the planning process, trying to determine how various tasks and events should be ordered. To overcome these problems, Rovegno (1997) suggested teachers ask themselves, “Why am I teaching this activity? And where is it going?” (p. 159). Also, when teaching their
unfamiliar unit of content, the participants had difficulty discussing how the unit could be extended. Jaimie attempted to discuss what she would do the following year if she taught the same groups of students team handball again, but she was unclear and unable to explain herself when asked to do so. It appears that after teaching the team handball unit and watching the presentation by a guest speaker, she was aware that there was much more to the game than she had originally thought, but other than recalling some of the comments made by the guest speaker, she was relatively unclear about what to do next. Steven stated outright he did not think there was much more one could do with an archery unit than what he had already done. At no time, did the participants discuss how their units contributed to the overall goals of the physical education program. Also, at no time did the participants discuss their understanding of how the units they were teaching fit into the yearly curriculum or the high school curriculum in general.

When teaching their familiar units, the participants could easily discuss what they would do to extend the units. For example, Steven suggested students would have to apply their knowledge by creating individual fitness plans and he would attempt to demonstrate the relevance of fitness programs to the students by bringing in guest speakers. For teachers to be able to deliver appropriate tasks and progressions that “take students beyond that introductory unit that seemingly gets taught again and again and again” (Siedentop, 1989, p. 8) then content knowledge is crucial (Doutis, 1997). As described above under the ‘Pedagogical Content Knowledge: Knowledge of Student Understanding’ component, this information could be incorporated throughout the undergraduate curriculum.
Pedagogical Content Knowledge: Knowledge of Instructional Strategies

When teaching his unfamiliar unit of content, Steven and his cooperating teacher discussed at length a number of strategies that would help him deliver more effective lessons. Similar conversations with his cooperating teacher relative to his fitness unit, were noticeably absent. Steven’s cooperating teacher recognized that due to his lack of archery knowledge, he was having difficulty explaining various concepts to students (Grossman, 1991) and attempted to provide him with information that would assist him in delivering more effective lessons. Developing appropriate representations of subject matter takes time but with the help of his cooperating teacher and more teaching experience, Steven’s ability to present the content will likely improve (McDiarmid, Ball, & Anderson, 1989).

Jaimie discussed at length how her methods instructor had taken the class through a series of activities in which various track and field activities were broken down and how they were shown how to present such activities to students. With respect to track and field, Jaimie initially possessed what Tinning (1992) called weak practical knowledge. That is, she knew about and could perform track and field content. According to Tinning, there is no guarantee that weak practical knowledge is useful for representing content to students. Rather, Tinning has suggested that teachers need strong practical knowledge. Tinning described teachers possessing strong practical knowledge as those teachers who can transform their knowledge about an activity and present it to various groups of learners in ways that are understandable to the group. Tinning’s strong practical knowledge and Shulman’s (1986, 1987) pedagogical content knowledge are
similar. It appears that when content knowledge is lacking, the process of transforming and combining content knowledge and pedagogical knowledge or weak practical knowledge into strong practical knowledge, is very difficult. Jaimie’s continual reference to the usefulness of the track and field activities learned in her methods class underscores the importance of educators helping pre-service teachers develop pedagogical content knowledge or strong practical knowledge. As described above under the ‘Pedagogical Content Knowledge: Knowledge of Student Understanding’ component, this information could be incorporated throughout the undergraduate curriculum.

**Knowledge of Context**

Most of the information gathered about the context in which the participants were teaching was administrative in nature. That is, the participants sought or were provided with information that was necessary for them to succeed during their internship. For example it is obviously important the pre-service teachers knew when classes began and ended, what facilities and equipment were available, and any procedures that were in place that were specific to each individual setting. Since context is specific to each individual school, it is not surprising that the participants first gathered this information after being placed in and visiting their respective settings. Although context can affect the pre-service teachers’ ability to teach effectively, the independent nature of schools makes it difficult for relevant information to be passed onto students prior to their arrival in the particular settings in which they will be teaching.

The participants appeared to lack knowledge of students. Knowledge of students refers to being aware of the characteristics of the specific group of students the teacher is
teaching (Grossman, 1990). Both participants complained that the students were unmotivated and they were bothered and frustrated by the apathetic behavior of the students. Perhaps, both participants expected their students to be a homogeneous group of students “like themselves”. That is, the participants' memories of themselves in physical education classes in high school and university included memories of practicing drills, playing games, getting along with classmates, and doing what the teacher asked. When placed in a setting where all students were not as motivated and compliant as they remember themselves to be, they became frustrated. Perhaps the students were unmotivated because they felt the activities in which they were required to participate lacked relevance or were developmentally inappropriate.

Perhaps one way to attempt to provide pre-service teachers with more knowledge about students is to engage pre-service teachers in open discussions with students. Rather than sending a university class into the schools, maybe a panel of students from a variety of different contexts could be brought in to speak to the pre-service teachers. Or, university students could be paired with a public school student, again from different contexts, and email discussions could ensue.

Another way to begin to provide students with more knowledge about students and the issues that consume their lives, is through short stories and novels. For example, Pipher’s (1994) *Reviving Ophelia, Saving the Selves of Adolescent Girls*, and other such books that speak to the lives adolescents, could become required reading, after which open discussions that relate the information back to teaching, could ensue.
Sources and Relevance of Knowledge Acquired

The knowledge participants gathered as they proceeded through both their unfamiliar and familiar units of content came from a variety of sources. These sources included books, the participants’ cooperating teachers, past experiences as students, in Jaimie’s case a teaching peer, disciplinary background, professional coursework, and learning from experience. These sources appeared to be relevant sources of knowledge for the two participants in this study.

Books

Grossman, Wilson, and Shulman, (1989) have stated, “textbooks become, for many teachers, major sources of new content knowledge…” (p. 28). Prior to teaching the units, both participants perused a number of different print sources in a search for content knowledge. When participants were unfamiliar with the content they looked to books to guide them step-by-step through their lessons and units. When the participants were familiar with the content, books were used to seek out new drills and activities that could be added to the current list of tasks already included in the lessons. When participants used books for skill development purposes, they were used to see if the books offered any simple activities, cues, or techniques to add to their current knowledge of content.

With respect to the relevance of books as a source of knowledge when teaching unfamiliar content, two different scenarios occurred. If the participant had at least a minor understanding of the way in which the activity was to occur, and if they found a book which outlined each skill to be covered in relatively simple terms, then they went
step-by-step through the book, following the suggestions in the book. When the book provided the participants with enough information to get them through each lesson and the unit as a whole, they felt that books were a relevant source of content knowledge. In teaching archery, Steven relied heavily on the *Steps to Success* book (Haywood & Lewis, 1997). The *Steps to Success* series of books basically simplifies an activity into a series of skills and then outlines the actions included in the preparation, skill execution, and follow through phases of each skill, providing a verbal and visual explanation for each phase. In a discussion about Steven’s ability to critique and use books he stated,

> With archery, I would definitely pick it [the book] up and go step-by-step through the book. With fitness, I would probably be a lot more discriminating. I’d probably be a lot more likely to take an activity or two from this book, one or two activities from that book and devise my units and lessons in that manner. I think I’ve probably used about 20 different books for my fitness unit. With archery, I have to follow the book (post lesson interview, May 26, p. 7).

However, in the case where the participants had a minimal understanding of the activity, they were unable to understand the majority of the information the books contained. For example Jaimie stated she was completely unfamiliar with team handball but assumed it was similar to ultimate Frisbee. Jaimie commented that the books she did read were confusing and irrelevant and it was difficult for her to translate what she was reading into something that would be useful and relevant for her students. As Jaimie stated, “it was a little confusing actually, because I didn’t know anything, I’d never seen it, never really played it... how do you make a 6th grader understand it” (post lesson interview, May 17, p. 5). This finding supports statements made by Grossman, Wilson, and Shulman (1987) and findings in science (Hashweh, 1987), and reading, math, and social studies (Ball & Feiman-Nemser, 1988) that when teachers possess inadequate
content knowledge they often find themselves unable to critically appraise the contents of a book.

If the participants were familiar with the content, they were more likely to report that the books were a relevant source of information. Perceiving the books as relevant was largely due to the fact that they were better able to discriminate whether the activities would be useful for their needs. Also, when familiar with an activity, both participants stated that even if they felt a drill or activity was not useful ‘as is’ in the book, they both felt that they would have been able to modify the drill or activity to suit their needs.

With increased content knowledge, the incidences of teachers reporting books to be irrelevant, will likely decrease. However, a pre-service physical education teacher will likely not be unfamiliar with some content. Therefore, in an effort to assist teachers when they begin teaching, they could be introduced to a variety of resources that are intended for use by the beginner, intermediate, and advanced knower of content. In this way, the teacher will have a starting point from which to begin to gather information.

The Cooperating Teacher

When learning to teach, most practicum experiences place a student teacher with an experienced mentor teacher or cooperating teacher. Steven and Jaimie were no exception. Both cooperating teachers were experienced teachers. Julie, Steven’s cooperating teacher proved to be a huge source of knowledge for Steven. Almost daily, Julie and Steven discussed the day’s teaching sessions. These discussions not only occurred prior to and between classes, but were conducted at length at the end of the day. Julie and Steven audio taped a number of their end-of-the-day conversations and allowed
the researcher to use them as data. Their conversations included a number of topics from feedback, to safety, to activities, to changing the environment, etc. Julie also regularly coded different teaching behaviors and she and Steven discussed the coded sheets, interpreted them, and decided the focus of Steven’s teaching for the next day.

Although Jaimie’s cooperating teacher had a number of years of experience, she was less than helpful and provided Jaimie with a minimal amount of information. Jaimie’s cooperating teacher basically let Jaimie do what she wanted. In a brief discussion with her, the cooperating teacher stated she felt it was up to Jaimie to learn things on her own (researcher field notes, May 17). Even when her cooperating teacher disagreed with what Jaimie was doing, she still offered no comments (researcher field notes, May 7). As a result, Jaimie received little help from her cooperating teacher. Jaimie did receive some help from her teaching partner’s cooperating teacher. She described the help she received from Mr. Bedard as the provision of mainly encouraging statements like “don’t worry, try again”. However, there were two instances where he did provide some relevant information regarding safety and student groupings.

It appears that Jaimie’s cooperating teacher was much like the cooperating teachers investigated by Tannehill and Zakrajek (1998). After interviewing 18 high school teachers, Tannehill and Zakrajeck (1988) found that it was not uncommon for the secondary cooperating teachers in their study to offer minimal feedback and conduct infrequent observations of their intern. On the other hand, Julie, Steven’s cooperating teacher, was very much involved with Steven’s practicum, regularly observing and coding Steven’s lessons, and providing regular feedback. Julie had worked with several
student teachers in the past, had taken a graduate level course in the supervision of student teachers, and worked at the local university as clinical educator. Perhaps, as a result of these experiences, Julie felt comfortable and confident supervising and interacting with student teachers. Jaimie’s cooperating teacher provided no evidence that she shared any of the same experiences. Perhaps Jaimie’s cooperating teacher did not feel comfortable in her role as cooperating teacher or felt unprepared for the job (Rikard & Veal, 1996), thus the limited interactions and feedback she provided to Jaimie.

Supervisory training (Ocansey, 1988; Rikard & Veal, 1996; Siedentop, 1981) has been shown to positively affect the supervisory abilities of cooperating teachers. Thus, to enhance the practicum experience for pre-service teachers, where and when possible, students should be placed with cooperating teachers who have taken part in supervision training.

Past Experiences as Students

Prior to teaching, the participants had spent a number of years as students in the public school system and as participants on school teams.

According to Ball and McDiarmid (1990),

Their precollege education forms a much bigger chunk of their formal education than does the relatively brief period of college study. Not only is the precollege phase of subject matter study longer than the college period, but also the content studied in elementary and high school classes is often closer to that that prospective teachers actually teach (p. 441).

As a result of the time spent in schools, the participants have memories of being students themselves, the books they used, the content they remember studying, the ways in which they remember their teachers presenting similar content, and how they
remember feeling about the content. During this time Lortie (1975) suggested students believe they learn how to teach from watching and remembering how their former teachers taught and refers to this as an apprenticeship of observation. Apprenticeship of observation did prove to be a source of pedagogical content knowledge for the participants. For example, one day during her track and field unit when Brett was absent and Jaimie was struggling with the lessons, she thought about giving up the planned classes and playing games with the students. At this point, she remembered some low organized games she had played in middle school. As she was thinking out loud in front of the researcher, she was asking the researcher for her opinion of the games she was recalling (field notes, May 17). Also, some of the lead up games Steven used to begin his fitness classes were ones he recalled playing when he was in middle and high school.

The apprenticeship of observation did not appear to be as powerful for Jaimie and Steven as it has for other physical education pre-service teachers. In an effort to ensure that the memories pre-service students draw upon are quality ones, education coursework may include exploring the past experiences of students to discuss practices that are aligned or differ from developmentally appropriate practices. Directly confronting beliefs and practices that do not align with appropriate practice is likely to create cognitive dissonance on the part of the pre-service teacher. Cognitive dissonance is necessary for the pre-service teacher to begin to look for alternatives to what they are familiar with. Perhaps conducting an activity at the beginning of the year, will force the pre-service teacher to pay closer attention to, and participate more, in their education classes as they search for possible solutions to the dissonance.
Teaching Peer

Jaimie’s teaching partner appeared to be a source of knowledge for her. Jaimie’s teaching situation was such that she and a teaching partner alternated classes. That is, Brett, her teaching partner, would teach the first class, Jaimie would teach the next two classes, Brett would teach the fourth class, Jaimie would teach eighth period and Brett would finish the day teaching period nine. Although many times, both Jaimie and Brett were on the floor together teaching, one person always took the lead and was ultimately responsible for the lesson. The lead person would take attendance, start the warm-up, introduce the lesson, provide all the demonstrations and explanations, group and transition students accordingly, and decide when class ended. When Jaimie was not directly responsible for teaching a particular class, she was always in the gymnasium watching and listening to Brett, and when the students were sent off to practice, she would, at times, move throughout the activity area helping provide feedback to students. The time Jaimie spent listening to and observing Brett as he taught, proved to be a valuable experience. For example, the explanations Jaimie provided changed from class to class and when asked why, she indicated that from watching Brett’s class “I see stuff in his [lesson] and think to myself, that was a good idea” (post lesson interview, May 6, p. 2). Field notes indicated that during a pre-observation discussion Jaimie mentioned that she was going to deviate slightly from the lesson plan and split students up into groups during the warm-up because when she watched Brett’s previous class, there were too many students running at once and it didn’t go very well (Field notes from May 7). Once again during the final interview when we talked about how she learned to plan and
teach her units, she repeated how useful her daily experiences were watching Brett. She said, “...him watching me and me watching him helped me a lot with the pedagogy, but it came down to a lot of trial and error on how I ended up learning how to conquer these different things” (final interview, p. 5).

Pairing pre-service teachers to work together during a teaching internship should be encouraged. This would allow the pre-service teachers to not only learn from each other, but it may ease the burden on teacher education institutions with respect to finding suitable placements for students. The experience could be strengthened if the pre-service teachers were required to take formal notes or code the others teaching when not directly teaching the lesson.

**Disciplinary Background**

Disciplinary background proved to be a major source of content knowledge. Disciplinary background generally refers to a teacher’s subject matter preparation. Distinguishing between disciplinary background and experiences is not always clear (Grossman, 1990), so for the sake of clarity, disciplinary background here will refer to past experiences in classes taken as part of their physical education degree, or experiences as a participant in education related workshops or in-services. As a result of their disciplinary background, when the participants were teaching units in which they were familiar with the content, they both stated how much easier they found the work. Many of the drills and activities the participants included in their lessons and presented to their students were ones in which they themselves had participated in before when they
were an athlete, ones that they had experienced in past physical education or activity classes, or ones they had learned at in-services, or other training programs.

Disciplinary background experiences proved to be a valuable source of content knowledge even when the participants were teaching unfamiliar content. In such instances, participants tried to relate past experiences that resembled present experiences to see if any of their past experiences could be transferred to their present unfamiliar context. Here, participants were similar to the participant in Schempp’s (1995) case study in that they too transferred their experiences from familiar sports to the unfamiliar ones they were teaching. For example, when trying to express how she developed her team handball unit, Jaimie stated that she “use[d] stuff from my soccer experience or my own invasion game experience and I try to relate that to the team handball” (final interview, p. 2).

Jaimie’s dependence on experiences that were familiar to her are aligned with the literature on learning unfamiliar material. After reviewing the literature on learning, Shuell (1990) presented an initial description of what various phases of learning may look like. He suggests an initial phase, in which one of the characteristics is to “rely on general, domain-independent problem solving strategies and knowledge from other domains to interpret the new information, to make comparisons and contrasts, and to find analogies that appear relevant to the learner” (Shuell, 1990, p. 541).

Professional Coursework

Professional coursework proved to be another source of knowledge. Whereas disciplinary background refers more to the knowledge teachers gain from their subject
specific degrees, professional coursework refers more specifically to subject specific methods courses and courses taken as part of a teacher preparation program (Grossman, 1990). Activities that Jaimie experienced as part of her education degree, proved helpful during her secondary teaching practicum.

Following a lesson observation, Jaimie was asked specifically about where she found a particular drill. Jaimie stated that in the previous year, three different professors had used the same drill in three different classes (post lesson interview, May, 4, p. 3). Jaimie felt she had to rely on past experience because she was unable to transfer the information contained in the books to her particular context. As she stated,

> When I’d look at the textbook to see how they set up the drills, I’d ask myself, ‘Can I do that? Can I make it work? Will the students understand it?’ When I answered no I decided to use activities that were more familiar to me, activities that I knew I could transfer from different sports to this one (post lesson interview, May 17, p. 4).

Both participants had previously completed an elementary physical education methods course and practicum where they spent time in an elementary setting, working and teaching with an elementary physical education specialist. As previously discussed, both participants were able to implement many teaching practices discussed during their elementary methods course when they were teaching elementary physical education classes. Also, in the elementary placement, they received regular feedback on various teaching behaviors from their university supervisors and cooperating teachers. It would be difficult to accurately determine the pedagogical knowledge or content that was gathered specifically during the elementary course and utilized or implemented in the secondary internship. However, Jaimie repeatedly referred to an activity that she found
very useful and relevant that was conducted specifically during her secondary methods class. This was time the secondary methods course instructor conducted classes in the gymnasium where the instructor demonstrated for the class how they could simplify track and field content and present it to their students. According to Jaimie, the instructor taught the students how to teach track and field – she provided the students specifically with pedagogical content knowledge for track and field. Although Jaimie perceived she was already familiar with track and field and felt she could have constructed a unit plan quite easily without the session, she made reference many times to the usefulness and relevance of the session (post lesson interview, May 17; final interview) stating the session provided her with a new means of presenting the content. The track and field activities learned during her secondary methods class that Jaimie repeatedly referred to during our discussions are the kinds of activities McDiarmid, Ball, and Anderson (1989) suggest that should be included in methods classes to assist the beginning teacher to teach for understanding. For Jaimie, it appears that such activities were quite useful.

Learning from Experience

Learning from experience is another source from which the participants gathered knowledge (Grossman, 1990; Grossman, Wilson, & Shulman, 1987; Lowenberg Ball & McDiarmid, 1990). This source of knowledge comes from teaching class after class on a daily basis or observing a cooperating teacher or teaching partner. This source proved to be a major and very relevant one for providing different types of knowledge that the participants drew upon to help them improve the delivery of their lessons.
Daily teaching experiences proved to be an extremely valuable source of knowledge for Jaimie as she mentioned (May 17, p. 17; final interview p. 4) that she received what she felt was very little helpful knowledge from her cooperating teacher. Daily experiences provided Jaimie with much needed pedagogical knowledge. For example, in relation to her team handball unit, she stated that she initially needed help with the content. However, once the unit plan was finally complete, her needs turned from knowledge about content to knowledge about delivery of the content. She stated, “as I went through and started teaching the different classes I think I needed a lot more help with the pedagogy part because there was a big difference with each class...” (final interview, p. 4). Since she did not get the information she required from her cooperating teacher, she relied on daily experiences to provide her with the information she needed. In her words, “it took teaching various classes and feeling like I failed. I didn’t do a very good job that period actually teaching before I felt I was improving. I had to resort to trial and error because I did not receive that much feedback” (final interview, p. 4). The teaching internship provides relevant learning opportunities for pre-service teachers. Time in the schools, teaching students with the assistance of a trained cooperating teacher, should remain a staple part of all teacher education programs.

Sources and Perceived Relevance of Knowledge Acquisition Summary

When students were familiar with the content, they relied on their past experiences as players, participants, or students in activity courses to help them both plan and deliver the content effectively. The fact that both students relied heavily on their past experiences points to the importance of providing students with a wide variety of
experiences during their undergraduate preparation programs (Graber, 1996) as well as teaching opportunities during their teacher preparation programs. The value of the internship for students learning to teach is well documented (Carnegie Task Force, 1986; Dodds, 1989; Graber, 1995; Holmes Group, 1986; Randall, 1992).

Types of Knowledge Not Addressed

Both participants received information about a number of different types of knowledge. However, there were types of knowledge neither of the participants sought or received. These included knowledge about the syntactic structures of the discipline (a component of the subject matter knowledge area); knowledge about the aims and purposes of education (a component of the general pedagogical knowledge area); and knowledge about the community (a component of the knowledge of context area).

Subject Matter Knowledge: Syntactic Structures

Syntactic structures refer to “the ways in which knowledge is brought into the field” (Grossman, Wilson, & Shulman, 1989, p. 29). The syntactic structures knowledge category was not discussed by either participant throughout the study. Grossman et al. (1989) have suggested that such information is usually required for students who major in an academic discipline however they have found evidence that some students fail to learn about their disciplines syntactic structures. The fact that both participants did not discuss this knowledge category does not mean they lacked this information. It could be that they were unable to connect such information to their immediate needs to teach various units of content. If teacher educators expect pre-service teachers to use syntactical knowledge, then such discussions must become part of teacher preparation programs.
Again, that is not to say such information was not provided, but rather that the participants did not see it as relevant to their immediate needs. As Grossman et al (1989) have stated, such discussions will encourage teachers to “stay abreast of, and evaluate critically, new developments in their fields” (p. 31).

General Pedagogical Knowledge: Other – Aims and Purposes of Education

Grossman (1990) provides little information on this component other than to state that this component includes the teacher’s general educational philosophy. Noll (1999) put forth a number of fundamental educational questions, some of which include, “What is an “educated” person? What should be the primary purpose of organized education? Who should control the decisions influencing the educational process? Should schooling be compulsory?” (p. xv). Examples of general educational beliefs or philosophies may include one’s ideas regarding the place of the schools in fostering the social development of students, one’s beliefs in the emphasis that should be placed on a liberal arts program aimed at developing students’ intellectual powers, one’s belief with regards to the place or role of a national curriculum, or one’s views of the role governments should play in education. Shulman (1987) has stated this knowledge is important but often overlooked by educational policymakers and staff developers. One’s overall educational philosophy impacts the manner in which a teacher selects and delivers content. Perhaps, with so many tasks to attend to as a beginner teacher, the participants, and their co-operating teachers, made choices with respect to knowledge areas they decided to focus their energy and attention. Maybe if the researcher had delved into this knowledge component
and pursued the issues more intentionally, data may have been available. Throughout the study, this knowledge component was not addressed.

Knowledge of Context: Community

Knowledge about the community includes being aware of community interests and values (Grossman, 1990), and being aware of “the character of communities and cultures” (Shulman, 197, p. 8). No more information, other than the quotes previously provided, are available. It is not surprising that the participants did not seek or receive knowledge of the community. Sumara (1996) has discussed at length how school learning is removed from the community setting in which it takes place. According to Sumara, this is often because teachers do not live in the neighborhoods in which they teach. Living away from the workplace often means the teacher has difficulty understanding the neighborhood culture that the students are a part of. Understanding the community in which the students come from, may in turn contribute to knowledge of student understanding and misunderstanding.

Enacted Effects

In discussing the importance of possessing pedagogical content knowledge, Griffin, Dodds, and Rovegno (1986) suggested teachers integrate everything they know to help students learn. This task becomes obviously more difficult when a crucial piece, like content knowledge, is limited. As Rovengo (1992b) stated, “without a deep, integrated understanding of content, the potential for teachers to help children learn worthwhile content is diminished” (p. 262). Both participants reported feeling uncomfortable when they were teaching their unfamiliar unit of content. For Steven
especially, his lack of archery content knowledge made him feel uneasy and as a result, he displayed little enthusiasm. The students in turn, displayed little enthusiasm and several students repeatedly selected not to participate or would participate sporadically throughout the class. The students’ lack of enthusiasm frustrated Steven and the cycle repeated itself throughout the unit.

Rink, French, Lee, Solmon, and Lynn (1994) found that some pre-service teachers had difficulty integrating knowledge acquired in various methods courses. Similar to Graber’s (1996) participants, the pre-service teachers in this study, appeared to be able to integrate knowledge gained from a variety of sources, such as methods classes, past physical education classes, and past experiences, with less difficulty when they taught familiar content. This is important because if students are able to integrate material from a variety of sources, it is more likely that material presented in methods class will make more sense and there is also the potential that more material will be able to be covered in the limited time that educators have to prepare teachers. For example, a methods instructor may have decided they want students to understand the concept of content development and complete a developmental analysis (Rink, 2000). To develop student understanding, the instructor may use a particular activity, say tennis, to demonstrate how to proceed to complete the developmental analysis. To complete the activity, students must not only have an understanding of the game of tennis, but also understand child development (important for racquet size, weight, and type of ball used), motor learning, sports medicine (what is tennis elbow, how does it develop, what are signs and symptoms, how to correct it) and exercise physiology (how does tennis contribute to a
programs overall fitness goals? Is tennis an aerobic or anaerobic activity, does it develop muscular strength, endurance, or both?). If students are able to integrate knowledge gained in other courses, it is more likely the instructor will have to spend less time re-visiting the material. As a result, there will be time to cover more content. Having knowledge of the content they taught, the participants were able to manipulate their content knowledge and combine it with pedagogical knowledge to develop pedagogical content knowledge (Rovegno, 1992a). The result was that the participants were more easily able to interact with students, develop appropriate lessons, observe student performance and provide appropriate feedback, simplify skills, and modify lessons on the spot.

Conclusions and Implications

The purpose of this investigation was to examine and describe knowledge development in student teachers during a secondary, physical education teaching internship, when the students were teaching content they perceived was unfamiliar and familiar content. The focus of this investigation was on the types, sources, and perceived relevance of the knowledge student teachers acquired, and the enacted effects of their knowledge development, as they learned to teach a unit of content in which they felt they had either little or extensive knowledge and experience. This study has shown that content knowledge is important! There were differences in the participant’s ability to plan and deliver lessons when they were teaching content they perceived themselves to be unfamiliar and familiar. This finding underscores the need for activity courses to remain a staple of undergraduate physical education programs. With increased content
knowledge of activities included in the public school physical education curriculum, it is more likely that student learning, beyond surface level understanding, will occur (Siedentop, 1983).

Another finding from this study was that teachers use resources differently based on their knowledge of content in that area. Perhaps to assist teachers searching for information on topics for which they are unfamiliar, pre-service teachers could be directed to various resources designed for the beginner or advanced knower of a subject.

A further finding from this study was that general pedagogical knowledge does not transfer across contexts. Being successful at the elementary level does not ensure the same teacher will be successful at the secondary level. Likewise, being successful in an urban context does not ensure the same teacher will be successful in a suburban context. Therefore, pre-service teachers must be provided with opportunities to teach in a variety of different contexts.

This study has shown that the possession of general pedagogical knowledge and content knowledge does not necessarily translate into the possession of pedagogical content knowledge. Directly teaching pedagogical content knowledge is the most likely way to ensure that pre-service teachers acquire such knowledge. This information should become part of activity courses or methods courses.

Furthermore, this study has found that Grossman’s model of teacher knowledge is partially useful for pre-service physical education students. To be more useful, the model needs to be expanded and refined for use in the physical education domain. Including
issues such as safety is only one such example. Further work at developing a model of
teacher knowledge for physical education may prove useful.

The findings from this study allow for further understanding of the types of
knowledge student teachers seek, the sources of their knowledge acquisition and whether
or not the teachers felt the information was relevant. This is important information as it
can help university personnel make more informed decisions about program offerings
and requirements for physical education majors. It is also useful information for
university instructors working within teacher preparation programs as it points to areas
pre-service teachers see as relevant information or topics that could be covered during
course work that may better prepare the pre-service teacher for a more effective teaching
career. For example, specifically teaching students how to teach a specific activity as
opposed to offering lessons in generic teaching strategies.

The importance of content knowledge is obvious. However, content knowledge
alone is not enough to effectively teach particular content. Teachers need to know how to
present the content to students in an effective manner. To do so requires that teachers:
are aware why they teach particular content and how it should differ from grade to grade;
are aware of the ‘conceptions and misconceptions’ students are likely to hold about the
content; are aware of the curricular materials available to teach subject matter; and are
provided with or given the opportunity to develop ‘rich repertoires of metaphors,
experiences, activities, and explanations’ that will aid the teaching of a particular topic.
In essence, teachers must possess pedagogical content knowledge. Educators must not
assume that such knowledge will automatically develop with practice or experience.
Rather, pedagogical content knowledge is knowledge that should be provided to students directly. Educators are beginning to realize this and some discussion has begun to take place (Barrett, 1998; Graber, 1995; McLaughlin, 1998; Mitchell, 1998; Rovegno, 1995a). A more concerted and deliberate attempt should be made to teach pedagogical content knowledge both in methods courses and activity courses.

Recommendations for Research

1. Exploring Teachers’ Knowledge of Student Misconceptions in Physical Education

   Knowledge of student understanding is a knowledge category of pedagogical content knowledge. Included in this category, are the “conceptions and misconceptions of particular topics in a subject matter” (Grossman, 1990, p. 8). As Grossman (1990) further explains, teachers must know something about what students may have difficulty with and what they already know about a subject if they are going to be able to represent the content appropriately to students. It would seem that a teacher’s knowledge of what students know about a topic is crucial to being able to effectively plan meaningful lessons. Future research that explores teachers’ knowledge of student understanding would seem a valuable addition to the literature.

2. Directly Teaching Pedagogical Content Knowledge

   During their secondary methods course, Steven and Jaimie were both provided with sessions where they were specifically taught how to teach or present track and field content to students. This proved to be extremely valuable to Jaimie as the majority of her track and field unit came from the sessions she participated in during methods classes. What is interesting is the effect the sessions had on Jaimie’s perceptions of how she
would, and eventually did, teach track and field. Even though Jaimie had taken a track and field activity class, had participated as a track and field athlete, regularly watched track and field on television, and her dad had coached track and field for years at the secondary level, she found the methods classes to be the most valuable. This attests to the value of teaching pedagogical content knowledge directly as opposed to teaching content in one course, pedagogy in another, and then expecting or assuming students will be able to put the two together in a manner that is coherent for the group of students they are teaching. Jaimie’s case discussed above is only one such case. Further investigation would be needed that examined the extent to which directly teaching pedagogical content knowledge was able to influence how beginner teachers taught.

3. Knowledge of Student Understanding

During the initial interview with Julie and Steven, Julie stated that after having taught fitness for a number of years, she realized that students weren’t getting much out of the unit - they weren’t enjoying it, and they held the misconceptions Steven talked about. It took Julie seven years to realize this and come to the conclusion that she needed to make fitness fun, something Steven was aware of from the beginning. It would be interesting to examine how teachers eventually find out about the conceptions and misconceptions about particular content that students have? Are there clues teachers can look for, or questions they could be asking?

4. Feeling comfortable teaching unfamiliar content

After having taught units both participants perceived they were unfamiliar with, they both stated that they would feel a little more comfortable teaching the unit again, but
not as comfortable teaching a unit of content they felt they were more familiar with. It would be interesting to follow a teacher, teaching the same unfamiliar content over a number of units and years to see how long it takes them to become comfortable or to see if one ever does feel comfortable teaching content they perceive as being unfamiliar with?

5. Examining Professional Coursework

In discussing the sources of pedagogical content knowledge, Grossman (1990) suggested professional coursework, more specifically subject-specific methods courses, was the most logical place for future teachers to acquire pedagogical content knowledge. However, she proceeded to discuss how little is known about what actually goes on in methods courses. She stated what we do know about the content of methods courses has been gathered unsystematically and haphazardly. I would suggest taking a closer look at what is being presented to students in their physical education methods courses and how students are interpreting, understanding, and implementing the ideas in their own classrooms.
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APPENDIX A

MODEL OF TEACHER KNOWLEDGE
Model of Teacher Knowledge (Grossman, 1990)

APPENDIX B

INFORMED CONSENT FORM
Consent to Participate in a Social Science Research Study

I ___________________________ have volunteered and agreed to participate in the research study titled, The Types, Sources, and Perceived Relevance of Knowledge Acquisition, and the Enacted Effects When Teaching Unfamiliar and Familiar Physical Education Content.

Lynn Schincariol, who will be engaged with the data collection process, has explained the purposes of the research to me. Possible benefits of the study have been described to me, as have any possible alternative procedures, if such procedures are applicable and available.

I acknowledge that I have had the opportunity to obtain additional information regarding the study and that any questions I have raised have been answered to my full satisfaction. Further, I understand that I am free to withdraw consent at any time and to discontinue participation in the study without prejudice to me.

Finally, I acknowledge that I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: ____________________________  Signed: _______________________
(participant)

Signed: __________________________
(principle investigator)

Witness: __________________________
APPENDIX C

PHYSICAL ACTIVITY RATING SCALE
Physical Activity Rating Scale

Directions:
Below is a list of activities that may be part of a secondary physical education program. For each activity rate your knowledge of content prior to beginning your secondary teaching experience and your ability to teach the content. Content knowledge refers to how well you believe you know the content of the activity listed. Teaching ability refers to how well you believe you can teach the activity listed. For all items, use the following scale:

1 = None  2 = Little  3 = Some  4 = Good  5 = Excellent.

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- Sprints ..................... 1 2 3 4 5 1 2 3 4 5
- High Jump .................... 1 2 3 4 5 1 2 3 4 5
- Hurdles ...................... 1 2 3 4 5 1 2 3 4 5
- Long Jump ................... 1 2 3 4 5 1 2 3 4 5
- Shot Put ..................... 1 2 3 4 5 1 2 3 4 5

**Ball Activities**
- Baseball ..................... 1 2 3 4 5 1 2 3 4 5
- Basketball ................... 1 2 3 4 5 1 2 3 4 5
- Golf .......................... 1 2 3 4 5 1 2 3 4 5
- Flag Football ................. 1 2 3 4 5 1 2 3 4 5
- Touch Football ................ 1 2 3 4 5 1 2 3 4 5
- Lacrosse ...................... 1 2 3 4 5 1 2 3 4 5
- Handball ..................... 1 2 3 4 5 1 2 3 4 5
- Soccer ........................ 1 2 3 4 5 1 2 3 4 5
- Softball ...................... 1 2 3 4 5 1 2 3 4 5
- Volleyball ................... 1 2 3 4 5 1 2 3 4 5

**Dance**
- Aerobic Dance ............... 1 2 3 4 5 1 2 3 4 5
- Ballet ....................... 1 2 3 4 5 1 2 3 4 5
- Disco ........................ 1 2 3 4 5 1 2 3 4 5
- Folk Dance ................... 1 2 3 4 5 1 2 3 4 5
- Jazz .......................... 1 2 3 4 5 1 2 3 4 5
- Modern Dance ................ 1 2 3 4 5 1 2 3 4 5
- Social Dance ................ 1 2 3 4 5 1 2 3 4 5
- Square Dance ............... 1 2 3 4 5 1 2 3 4 5
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APPENDIX D

INITIAL INTERVIEW QUESTIONS
Initial Interview Questions

1. Can you tell me a little bit about your background in physical education? (program, courses, strengths, weaknesses, etc.)

2. Let’s talk specifically about two of your upcoming units. What is your prior experience with this (activity)?

3. What do you think it means for someone to know (activity)? If someone were a self-proclaimed expert in (activity) what would you expect them to know and be able to do?

4. How would you describe your knowledge of (activity) content?

5. What skills or concepts related to (activity) do you think are most important for students to learn? Why those skills and concepts? / How did you decide to focus on those skills or concepts?

6. What are your objectives for your (activity) unit?

7. What do you think your students already know about (activity)?

8. What do you think your students are likely to find difficult?

9. How comfortable do you feel about teaching (activity)?

10. Do you have any reservations about teaching (activity)?

11. Do you foresee any potential problems or difficulties that you may have while you’re trying to teach the (activity) unit? If yes, how do you plan on handling that?

12. What have you done to prepare to teach (activity)?
13. If not answered in the previous question, then, where did you get the information to put together your (activity) unit plan?

14. Is anyone helping you put together your unit and lesson plans? How are they helping?

15. Do you have any expectations for yourself and your students for the upcoming (activity) unit?

16. What do you know / have you learned about (middle / high school) students?

17. Did you take that into consideration when planning the unit? If yes, how, if no, why not?

18. How are your classes scheduled / organized? Did that influence how you planned your unit and or how you plan to deliver your unit? If so, how?

19. Anything else you’d like to share or any other concerns or comments?