RELATIONSHIPS AMONG CONTENT KNOWLEDGE, PEDAGOGICAL KNOWLEDGE, AND TEACHING PERFORMANCE OF PHYSICAL EDUCATION STUDENT TEACHERS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

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****

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ABSTRACT

Relationships among volleyball content knowledge (CK), pedagogical knowledge (PK) and teaching performance in volleyball were studied for fifteen physical education student teachers in Korea. Two written tests were used to measure the subjects' level of CK and PK. Distinctions were made between those who prepared for the tests (KNTE-P) and those who did not (KNTE-NP). In addition, their volleyball course grades were retrieved. Forty-five volleyball lessons were videotaped and coded using a modified ALT-PE system and a modified QMTPS instrument. Spearman rank-order correlations and multiple regressions were computed to establish relationships among the variables tested. Statistical significance was set at the .05 level.

The results of this study can be summarized as follows. No significant relationship was found between CK and the volleyball course grade. The subjects' total average score of PK was 9 points (8.6%) lower than that of the NTE applicants. The teachers spent 14.6% of class time for Management, 7.1% for Transition, 15.2% for Knowledge, 9.6% for Non-focused, 41.3% for Waiting, and 12.1% for ALT-PE. The mean percentages of QMTPS categories were 68.9% on Clarity of task presentation, 35.8% on Use of demonstration, 46.7% on
Appropriate number of cues, 37.5% on Accuracy of cues, 51.8% on Qualitative cues provided, 41.9% on Length of presentation, and 46.2% on Total QMTPS.

No significant relationship was found between CK and PK. A low relationship was found between CK and ALT-PE (rs = 0.33). A significant relationship was found between PK and time in transitions (rs = 0.64, \( \rho < .01 \)), Knowledge (rs = 0.57, \( \rho < .05 \)), Qualitative cues provided (rs = 0.64, \( \rho < .01 \)), and predictor variables such as Management, Transition, and Waiting (\( R^2 = 0.58, \rho < .05 \)). CK and PK were positively related to Total QMTPS (\( R^2 = 0.41, \rho < .05 \)), while no relationship existed among CK and PK and ALT-PE.

These findings suggest that CK was not related to teaching performance while PK was related to some teaching performance variables. A more comprehensive evaluation of teachers' knowledge was recommended to understand the level of teachers' knowledge and its role in teaching performance.
This study is dedicated to my dear father, who passed away during the course of my study, to my mom, who prayed all the time for its successful completion, and to my family--Sook, my wife, Hanah, my daughter, and In-Kwon, my son.

If not for their support, love and prayers, I could never have completed this long and difficult work.
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CHAPTER 1

INTRODUCTION

The quality of education largely depends on the quality of teaching, because most educational practices are still performed by teachers. Thus, efforts to improve the quality of education must coordinate with efforts to improve teachers' quality and competence. In order to better comprehend and promote such coordination, educational researchers have conducted research on teaching during the last half century using various research paradigms. Research on teaching in physical education has followed the lead of these more general studies, focusing on teaching effectiveness, process-product studies, teacher behavior research, and teacher-student interaction research.

Using the Dunkin and Biddle (1974) model, researchers have described and examined relationships among presage, context, process, and outcome variables. Initially, much effort was spent in simply describing what teachers did and then what students did in classrooms. Early efforts also tried to correlate teacher behavior with student outcomes in a process-product model (Medley, 1985). Eventually, however, it became clear that teachers did not influence student outcomes directly but, instead, influenced what students did
in classes, thus initiating the mediating-process paradigm of teacher effectiveness research (Berliner, 1979).

During much of the era in which the mediating process-paradigm guided teacher effectiveness research, presage variables were largely ignored. In the mid-1980s teacher effectiveness research began to conceptualize good teaching (Medley, 1985) as effective orchestration of a repertoire of skills and applied decision-making. Shulman's (1986b) seminal paper on domains of knowledge influenced researchers to consider how teachers brought their knowledge to bear specifically on learning situations with particular students.

Shulman (1987) outlined seven categories of knowledge in his article. They include: (1) content knowledge, (2) general pedagogical knowledge, (3) curriculum knowledge, (4) pedagogical content knowledge, (5) knowledge of learners and their characteristics, (6) knowledge of educational contexts, and (7) knowledge of educational ends, purposes, and values, and their philosophical and historical grounds. Although Shulman (1987) has a special interest in pedagogical content knowledge, content knowledge, or the knowledge, skill and understanding to be learned by school children, is another important category of knowledge. General pedagogical knowledge, those principles and strategies of classroom management and organization that appear to transcend subject matter, merit special reference (Shulman, 1987).

Student understanding of subject matter is a primary objective of teaching. Teachers have a responsibility to convey subject matter clearly. Pedagogical knowledge is essential in terms of the effective
transmission of subject matter knowledge. Although copious research has been done on various patterns of teaching behavior, such as the teacher's use of time, task presentation, feedback and classroom management, little is known about how content knowledge affects process variables (Dunkin & Biddle, 1974). Harari (1986) spoke to this lack of research:

Yet, the content itself, i.e., the subject matter as an important independent variable, was ignored. ... Moreover, teacher knowledge of the subject matter as a central variable in the process of teaching was neglected. The reason for such neglect had been the curriculum generic approach taken by the majority of the process-product scholars. The generic approach looks for uniformity, concepts and principles that apply across all or many subject matters. This generic approach jumps from one subject matter to another as if the content did not make much difference (pp. 2-3).

Research on teaching and teacher education has often been conducted without consideration for subject matter. Shulman (1986b) labeled this gap in the research on teaching and teacher education the "missing paradigm" problem.

So far, the most popular approach to research on teachers' knowledge seems to be studies of pedagogical content knowledge. Recent studies have been conducted on pedagogical content knowledge in education (e.g., Cochran, 1991; Collins, 1990; Deruiter, 1991; Gudmundsdottir, 1988, 1991; Kleinfeld, 1992; Marks, 1991), mathematics (e.g., Ebert, 1993; Hutchison, 1992; Mcgehee, 1990; Peck, 1991), reading (e.g., Evans, 1991), ESL (e.g., Zheng, 1992), science (e.g., Brickhouse, 1989; Ingvarson, 1992; Magnusson, 1991), music (e.g., Duling, 1992), physical education (e.g., Housner, 1993;
Rovegno, 1993; Walkwitz & Lee, 1992), and dance (e.g., Fortin, 1992). Pedagogical content knowledge, however, consists of several types of knowledge, including content knowledge, pedagogical knowledge, or content-specific knowledge. This can cause definitional ambiguity and give rise to some confusion (Marks, 1991).

For this reason, this study focused on teacher subject-matter knowledge and general pedagogical knowledge, rather than pedagogical content knowledge. Accepted methods for measuring these knowledge domains are more readily available, and all teacher education professional standards recognize them as important elements in teacher preparation and, therefore, important factors in effective teaching. In this study, teaching effectiveness was defined on the basis of two key systems: Academic Learning Time in Physical Education (ALT-PE) and Qualitative Measures of Teaching Performance Scale (QMTPS). Of particular importance, it would seem, is the focus on subject-matter knowledge in an era when the public and even professionals in education (Holmes Group, 1986) assume that one problem in school performance is that teachers do not know enough about the subjects they teach to students.

Unfortunately, few studies in physical education teacher education have examined teacher knowledge and its relationship to teaching practice. Graber (1995) described the study of teacher knowledge in physical education as follows:

researchers have only just begun to investigate teachers' knowledge and how that knowledge is acquired. In physical education, a few studies have emerged that provide deeper insight into general pedagogical
knowledge and pedagogical content knowledge. A number of these studies have focused on knowledge structures of teachers and have relied on asking subjects to complete a concept map in which relationships between and among ideas are analyzed. It is assumed that maps generated by experts would be more complex, better organized, and include larger aggregations of meaningful information units (p. 158).

Because it is generally agreed that a teacher's pedagogical knowledge is an important factor in the quality of instruction, many studies have been done on how teachers' pedagogical knowledge is related to their teaching performance (Lynn, 1989). However, few studies have been performed on the relationships among teacher's content knowledge, pedagogical knowledge, and teaching performance.

Although researchers agree that a teacher's knowledge base in subject matter and pedagogy are important components in the quality of instruction, little research has been conducted to support this assumption. Thus, the question at the heart of this study is: What is the relationship between a teacher's knowledge and his/her teaching performance?

Statement of the Problem

The purpose of this study was to examine the relationships among teacher content knowledge, pedagogical knowledge and the teaching performance of physical education student teachers.

The specific subject matter area for this research was volleyball, which is an important part of the physical education curriculum. In addition, volleyball is one of the most popular
activities in schools and communities in Korea. The subjects for this study were physical education student teachers enrolled in the teacher education program of a physical education department.

The research questions for this study were:

1. What is the volleyball content knowledge of preservice physical education teachers?
2. What is the general pedagogical knowledge of preservice physical education teachers?
3. How do preservice teachers manage and instruct their volleyball classes?
4. What relationships exist among content knowledge, general pedagogical knowledge, and teaching performance?

Definition of Terms

For the purpose of this study, the following definitions have been included:

Content Knowledge: "The technical aspects of the skills involved in a specific sport, 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 and the role it does and should occupy in local and national sport cultures, and developing technologies within the sport, and the psycho-social considerations associated with individual and group dynamics of players, and the ethical/moral dilemmas posed by competition" (Siedentop, 1989, p. 12). Subject matter knowledge was used as a synonym in this study.
**Instructional Representations**: Demonstrations, examples, or analogies the teachers use to present content to students, describe tasks, and provide feedback.

**Instructional Task**: Learning activities related to content taught which teachers assign to students.

**Pedagogical Content Knowledge**: The blending of content and pedagogy into an understanding of how particular topics, problems, or issues are originated, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction (Shulman, 1987, p. 8).

**Pedagogical Knowledge**: Principles intended to promote specific student learning which guide teachers managerial and instructional practices. For purposes of this study, it is sometimes referred to as "general pedagogical knowledge."

### Significance of the Study

Many educational researchers have focused their attention on pedagogical knowledge and how pedagogical knowledge affects teaching performance. Process variables such as teacher feedback and classroom management skills have dominated research on teaching in an attempt to understand the relationship between teacher behavior and student outcome. However, little is known about how content knowledge and/or pedagogical knowledge affect teaching effectiveness.

By studying the relationship between content knowledge and teaching performance, physical education teacher educators can gain
information about teacher education curriculum design. Also, by investigating relationships among content knowledge, pedagogical knowledge and teaching performance, teacher educators can acquire a valuable basis for deciding which components of the teacher preparation curriculum should be emphasized.

Limitations of the Study

First, the study was confined to fifteen physical education student teachers in Korea. Nine of the subjects were preparing for the Korean National Teacher Examination (KNTE), and six were not. Second, due to subject availability, there were only 15 participants. The results should not, therefore, be generalized to all Korean physical education student teachers but limited specifically to the subjects alone. Third, due to differences in Korean and American education culture, some misunderstandings of the test items might exist. However, efforts were made to overcome such differences through minor revisions made in the pilot tests. Fourth, context variables such as location and availability of courts were not taken into consideration. Fifth, subjects' direct application of content or pedagogical knowledge in teaching situations was not taken into account. Finally, the subjects' teaching performance for this study was measured by ALT-PE and QMTPS system.
CHAPTER 2

REVIEW OF LITERATURE

The review of literature is divided into three sections: research on teacher knowledge, research on teaching in physical education, and research on task presentation. The first section will address research on teacher knowledge, models of teacher knowledge, content knowledge, and general pedagogical knowledge. The second section will review research on effective teaching in physical education. In the third section, research on task presentation will be reviewed.

Teacher Knowledge Base

Research on Teacher Knowledge

Although the question of how teachers learn to teach is basic to the endeavor of teacher education, researchers have only recently begun to systematically frame and study this question (Carter, 1990). The problem is that "attention in teacher education has traditionally been focused on what teachers need to know and how they can be trained, rather than on what they actually know or how that knowledge is acquired" (Carter, p. 291).

Carter (1990) argued that research on teachers' knowledge overlaps and shares common themes, despite different approaches
that represent different assumptions, emphases, theoretical frameworks, and methodological commitments. She identified three different approaches; a) information-processing studies, which are typically framed in the technical language of psychology and often use controlled laboratory settings and/or standardized tasks and data collection procedures, b) studies of teachers' practical knowledge, which include not only studies of teachers' personal knowledge but ecological studies of the demands of the classroom environments, and c) studies of pedagogical content knowledge that utilize information processing and qualitative methods to build incidents, but focus on subject matter and the structure of explanations as fundamental characteristics of teachers' knowledge (1990).

It is difficult to summarize the findings of recent literature on teacher knowledge, because of varied utilization of qualitative and quantitative techniques on research on teacher knowledge (Fortin, 1992). In physical education, a few studies focused on the knowledge structures of teachers have been conducted (e.g., Griffey, Hacker, & Housner, 1988; Ennis, Mueller, & Zhu (1991); Rink, French, Lee, Solomon, & Lynn, 1994). These studies utilized the concept mapping method to analyze relationships between and among ideas (Graber, 1995).

Wilson (1988) points out that any research conducted in an effort to tie teacher knowledge to student understanding may be as fruitless an enterprise as the presage-product studies were, due to the absence of a powerful model of subject matter knowledge in teaching. Although many correlational studies were conducted in the
1970s to establish the degree of relation between student outcome measures and teacher knowledge measures, this presage-product research did not lead to any significant or conclusive results (Grossman, 1990). Grossman (1990) explains the nature of the discrepancies, suggesting that past research on teacher education has paid little attention to linking a professional knowledge base to the content of professional education. For instance, "while the surface curriculum reflects the normative belief that teachers need to know something about their subject matter, educational psychology, teaching methods, and the philosophical and social foundations of education, little research exists to illustrate whether and how teachers draw upon this knowledge in classroom practice" (p. 4).

Grossman also argued that teacher education has been informed by research on teaching which has been descriptive, focusing on teacher behavior rather than on teacher knowledge. Grossman criticized Lanier & Little's (1986) notion that teacher educators have occasionally tried to incorporate findings on teacher behaviors into teacher education research, asserting that "the attempts, however, lacked a theoretical framework for understanding both the prior knowledge and beliefs prospective teachers bring with them, and the knowledge of subject matter, students, and general pedagogy teachers need to draw upon the research judiciously" (p. 4).

In physical education, Rikard and Boswell (1991) have suggested a framework for preservice instructional development in the area of motor learning at the elementary school level. They asserted that "a teacher's knowledge base should include the
following four components: a) the knowledge of content rooted in various forms of games, gymnastics, and dance (content knowledge), b) subject matter knowledge of allied fields such as motor development and motor learning, c) the knowledge of generic pedagogical skills that are shared by effective teachers in general (pedagogical knowledge), and d) conceptualization of the development of a year-long school curriculum" (p. 31). The second phase of Rikard and Boswell's framework included the integration of knowledge. They defined integration in this context as "a carefully planned process of connecting separate subject areas that are essential to the field of study" (p. 31). As an example, they illustrated the integration of content from games, gymnastics, and dance with material from motor development through inter and/or intra sequencing of motor skills. Figure 2.1 shows the example of integrating content in games, gymnastics, and dance with content in motor development.

<table>
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<tr>
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<th>Content in Motor Development</th>
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<td>-Inter-task sequencing of motor skills</td>
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<tr>
<td>-Combination of skills for complexity and adaptability</td>
<td>-Intra-task sequencing of motor skills</td>
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<td>-Cognitive, psychomotor, and affective relationships in skill development</td>
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Figure 2.1: Integrating Content of Games, Gymnastics, and Dance with Content in Motor Development (Rikard & Boswell, 1991).
Rikard and Boswell suggested that "once a new understanding from these content areas is acquired it must be interwoven with the content from the third area of pedagogy" (p. 32). As a next step, they asserted that "once this combined knowledge from activity content and motor development is acquired, students are better prepared to integrate this new knowledge with pedagogical content" (p. 32). Figure 2.2 shows a sample of general pedagogical knowledge and pedagogical content knowledge that is essential to a teacher's behavior repertoire.

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<tr>
<td>- Task presentation</td>
<td>- Use of refining, extending, and applying tasks</td>
</tr>
<tr>
<td>- Use of feedback</td>
<td>- Use of congruent feedback and cueing</td>
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</table>

Figure 2.2: General Teaching Skills and Content Knowledge Needed by Preservice Elementary Teachers (Rikard & Boswell, 1991).

Rikard and Boswell concluded that integration of the total knowledge base (that is, the four components of knowledge), is needed to understand the process of successful teaching.

Walkwitz and Lee (1992) compared two groups of teachers in terms of their content knowledge level. One group of teachers was trained through a 4-hour training program in throwing skills. The
other group of teachers was served as a control group. One of the results of the study was that the knowledge-trained teachers' classes demonstrated more than twice as many opposite foot throws during the unit than the comparison teachers' classes. However, this study did not take account of the pupils' prior throwing skills.

A recent study on teacher knowledge (Rink, French, Lee, Solomon, & Lynn, 1994) focused on understanding how the knowledge structures of preservice teachers develop as expertise is acquired. This is an important aspect of teacher preparation. They compared pedagogical knowledge structures about the effective teaching of preservice teachers and teacher educators in the professional preparation programs of two different institutions. They asked two groups of preservice teachers to complete a concept map about effective teaching. The differences between the maps at each institution were then identified. Novice preservice students who had taken a generic teaching methods course incorporated fewer critical concepts into their cognitive maps of effective teaching compared to novice preservice students who had taken a beginning teaching methods course that was specific to physical education.

As we saw before, because research on teacher knowledge has been conducted by measuring teacher knowledge with different methods, it has been correlated both positively and negatively with student achievement (Grossman, Wilson, & Shulman, 1989). Therefore, an appropriate conceptualization of teacher knowledge is needed. Several models of teacher knowledge will be reviewed in the next section.
Models of Teacher Knowledge

Recently, educational researchers on teachers' knowledge have made efforts to describe the knowledge base of teaching. They developed several approaches to describe teachers' knowledge using their own models. Despite being individually arrived at, these models overlapped resulting in confusing usage of terms such as personal practical knowledge, craft knowledge, classroom knowledge, and pedagogical content knowledge (Carter, 1990).

Shulman (1987) asserted that one of the recurring themes of educational reform reports presented to the U.S. public has been the professionalization of teaching— the elevation of teaching to a more respected, more responsible, more rewarding and better rewarded occupation. He argued that the professionalism of teaching is based on a fundamental premise that standards by which the education and performance of teachers must be judged can be more clearly articulated and raised. He then raised questions on the knowledge base of teaching and related issues: "What is a knowledge base? Is enough known about teaching to support a knowledge base? Isn't teaching little more than personal style, artful communication, knowing some subject matter, and applying the results of recent research on teaching effectiveness?" (pp. 5-6).

The first model, the one most frequently cited by other researchers, was provided by Shulman (1987). He suggested seven categories for the teacher knowledge base: a) content knowledge, b) general pedagogical knowledge, with special reference to those broad principles and strategies of classroom management and organization that appear to transcend subject matter, c) curriculum knowledge,
with particular grasp of the materials and programs that serve as "tools of the trade" for teachers, d) pedagogical content knowledge, that special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding, e) knowledge of learners and their characteristics, f) knowledge of educational contexts, ranging from the workings of the group or classroom, to the governance and financing of school districts, to the character of communities and cultures, and g) knowledge of educational ends, purposes, and values, and their philosophical and historical grounds.

Shulman had a special interest in pedagogical content knowledge because he believed it identifies the distinctive bodies of knowledge used by teachers. However, the definition of pedagogical content knowledge is implicit (Fortin, 1992), and the nature of pedagogical content knowledge in physical education is not clearly defined (Walkwitz & Lee, 1992).

A second model was suggested by Elbaz (1983), who listed five categories of knowledge: a) knowledge of self, b) knowledge of the milieu of teaching, c) subject matter knowledge, d) knowledge of curriculum development, and e) instructional knowledge.

A third model designed by Leinhardt and Smith (1985) was intended to explore the relationship between expert teachers' classroom behavior and their subject matter knowledge in mathematics instruction. By relating subject matter knowledge to lesson structure, they categorized teachers' knowledge into subject matter knowledge and knowledge of lesson structure.
In a fourth model, Grossman (1990) presented four areas of knowledge based on emerging researchers' different definitions of knowledge components (see Figure 2.3).

I will be concentrating on subject matter knowledge, which is content knowledge, and general pedagogical knowledge. The discussion of pedagogical content knowledge and knowledge of context is beyond the scope of this study.
Content Knowledge

There is no doubt that a teacher's primary duty is to help students learn a certain content. Thus, teachers must possess the knowledge of the material to be taught. The knowledge on the material is called content knowledge. In general terms, content knowledge is defined as teachers' knowledge and understanding of the subject they are supposed to teach. However, in the framework of a knowledge base for teaching, content knowledge means more than the "material" students are expected to learn. Shulman (1987) defined content knowledge as "the knowledge, understanding, skill, and disposition that is to be learned by school children. This knowledge rests on two foundations: the accumulated literature and studies in the content areas, and the historical and philosophical scholarship on the nature of knowledge in those fields of study" (pp. 8-9).

In reality, as Ball and McDiarmid (1990) stated that "although subject matter knowledge is widely accepted as a central component of what teachers need to know, research on teacher education has not, in the main, focused on the development of teachers' subject matter knowledge" (p. 437), the development of teachers' content knowledge and its importance have been ignored during teacher preparation (Ball & McDiarmid, 1990).

Fortunately, some researchers (Gage, 1978; Ball & McDiarmid, 1990) argued the role of teachers' content knowledge in teaching. Gage (1978) asserted that the variables on teachers' content knowledge have to be considered in designs for research on teaching for a better understanding of teaching effectiveness. Following is the
review of literature related to the studies which have been conducted by employing either theoretical or empirical approaches to the study of teachers' content knowledge.

In a study of the instructional ecology in tennis lessons, England (1994) found that experienced tennis teaching professionals displayed high levels of tennis content knowledge and could transform that content knowledge into pedagogical content knowledge. She found that teachers transformed content knowledge into pedagogical content knowledge through effective sequencing of task progressions, combined with frequent feedback. This result suggests that pedagogical content knowledge requires high levels of content knowledge and pedagogical knowledge.

In a qualitative study focused on what physical education majors learn during field experience, O'Sullivan and Tsangaridou (1992) noted that undergraduate physical education majors emphasized the technical concepts of teaching with little attention to the social or ethical dimensions of their work or the content knowledge of their field. This implies that undergraduate physical education majors tend to lack the necessary content knowledge of their field.

Another qualitative study intended to investigate how people learn to teach was conducted by Rosenberg (1990). His central research question focused on differences in teaching knowledge that may be associated with training and experience. The results indicated differences among the participating teachers in content knowledge (volleyball), pedagogical knowledge, and pedagogical content knowledge. Trained teachers commented a greater
awareness of and concern for general teaching principles, while untrained teachers' comments focused more on the subject matter of volleyball. Experienced teachers, regardless of their training experiences, displayed a high level of understanding of the relationship between the nature of content and the needs of learners at different levels of skill development. Resenberg asserted that experienced teachers had a more elaborately developed sense of pedagogical content knowledge.

In a study on content development, Barrett, Sebren and Sheehan (1991) cited Shulman's (1987) notion that "teaching preservice teachers to plan, specifically the written lesson plan, is one vehicle to help transform their content knowledge into forms that are pedagogically powerful" (Cited in Barrett, Sebren and Sheehan, 1991, p. 79). They suggested that teacher educators need to "reexamine the amount and type of information they ask students to include, as well as the format students use" (p. 99).

A case study emphasizing teachers' content knowledge was conducted by Werner and Rink (1989). They stressed the importance of content knowledge, the ability to present information clearly, and holding students accountable for selected jumping and landing skills in second grade physical education. They found that inaccurate information and general global statements by teachers were not helpful to students and often resulted in inappropriate student responses. Based on the results of this study, they suggest that "inservice training can be effective in helping teachers enhance their teaching when motor skill acquisition is the objective" (p. 296).
Lynn (1989) conducted an experimental study on the effects of content knowledge and pedagogical content knowledge in beginning teachers' use of general pedagogical skills. She focused on several facets of teaching behavior: teacher use of time, content development, task presentation, feedback, and behavioral incidents. She had sixteen physical education preservice teachers teach a total of six lessons, two of which were in three different content areas: folk dance, basketball dribbling and passing, and striking with rackets and paddles. She identified high content knowledge and low content knowledge of the subjects using a 30-item multiple choice test on critical skill information and pedagogical knowledge, and divided subjects into two groups. One group of subjects taught the lessons in the order of low-high-low content knowledge area, while the other group of subjects taught the lessons in the order of high-low-high content knowledge area. By adopting a statistical analysis of 2 (order) x 3 (time) x 2 (lesson) MANOVA with repeated measures, she produced following results: a) during the high content knowledge lessons, "the teaching behavior of preservice teachers could be characterized by decreased instruction time and increased activity time, increased use of extension and application tasks with limited use of refinement tasks, the use of tasks presented clearly and accurately, the use of full demonstrations and summary cues before activity time, limited use of qualitative information, and increased use of specific feedback; b) during the low content knowledge lessons, the subjects' teaching behavior was characterized by increased instruction time and decreased activity time, increased use of repeating tasks, the use of task presented with a lack of clarity
and accuracy, increased use of full demonstrations and summary cues during activity time, limited use of qualitative information, and the limited use of specific feedback" (pp. 18-19).

She asserted that "the results of the study provide clear support for the influence of pedagogical content knowledge and knowledge of the content itself on the use of general pedagogical teaching skills. Most general pedagogical skills were significantly effected by the content taught" (p. 20).

In contrast, Stroot and Oslin's (1993) experimental study examined preservice teachers' ability to use component-specific feedback to positively influence elementary students' performance on the overhead throw. By analyzing videotapes, they observed that teachers possessed content knowledge but had a limited ability to apply the knowledge by providing appropriate feedback. This fact indicates that teachers need to have pedagogical knowledge in order to transmit their content knowledge into the teaching process effectively.

Focusing on preservice teacher's knowledge development, Ennis, Mueller, & Zhu (1991) examined knowledge structures in three groups of preservice physical educators— novices who completed knowledge structures during the first semester in the department, coursework group who completed two elementary methods coursework, and student teachers— and compared them with those of elementary physical educators who were regarded as experts in movement-based approaches. Through the cognitive mapping method, the ten frequency categories were organized into three groups: overview, relationships, and complexity. The second means
of classification, coherence, was expanded to four categories: the relevance of descriptor words, coherence of chunks, vertical sequences, and macro structure. Researchers suggested that "declarative knowledge evolves in complexity from novice to expert within the parameters of a concept-based movement curriculum" (p. 315). These results support the assumption that preservice teachers' declarative knowledge increases as a result of coursework and practical teaching experiences. It suggests that teacher educators have to prepare some experiences that encourage preservice teachers to form complex knowledge structures and thereby attain expertise.

Manross, Fincher, Tan, Choi, & Schempp (1994) investigated the role of subject matter expertise on the pedagogical content knowledge of physical education teachers. They collected data through multiple interviews with ten teachers who had expertise in at least one physical education subject area. They found that "there are significant differences between teaching expert and nonexpert subject matter areas. These differences include the recognition of problems in student learning, detail in planning and organizing subject matter, comfort and enthusiasm for teaching, and the ability to accommodate a range of learner skills and abilities" (p. 15). Based on the results, they agreed with "those who support deepening teachers' subject matter expertise is a way to improve teaching (Ball & McDiarmid, 1990; Grossman, 1992; Marks, 1990; Shulman, 1986, 1987)" (p. 15).
Pedagogical Knowledge

General pedagogical knowledge covers a very wide range of abilities, including;

lesson and unit planning, classroom organization and management, teaching techniques, student testing and grading... setting up a classroom for instruction, organizing groups, establishing routines... knowing how to ask questions at an appropriate level, establishing a proper pace of the questions and answers, monitoring the work of small groups or individuals at seat work, praising effectively and criticizing sensitively... forestalling discipline problems before they occur...and skillfully managing misbehavior in the classroom (Shulman & Sykes, 1986, pp. 9, 10)

General pedagogical knowledge is a teacher's knowledge of "broad principles and strategies for classroom management and organization that appear to transcend subject matter" (Shulman, 1987, p. 8). General pedagogical knowledge "represents comprehension of the duties and responsibilities of a teacher, as well as an understanding of the actions and activities necessary to meet and undertake those duties" (Graber, 1995, p. 158). Ebert (1993) defined pedagogical knowledge as "knowledge of the various schemas of classrooms which include different means of instruction (lecture, cooperative-group, guided discovery, for example) and different means of assessment" (p. 17). She maintained that "it is important to be able to find evidence of the existence of pedagogical knowledge in the instructional practices of teachers" (p. 17).

Despite the importance of teachers' pedagogical knowledge, teacher education programs have not been sufficient for the preparation of preservice teachers' pedagogical knowledge. Murray
(1990) pointed out that "the weakest component in the teacher education program is the pedagogical portion because our knowledge of educational practice is so speculative, episodic, and unstructured" (p. 10). Murray asserted that "matters have improved, however, in all areas of educational research and scholarship in the last twenty years so that a body of dependable information and more comprehensive and coherent theory has emerged" (p. 10).

Housner, Gomez, Griffey, and Housner (1993) examined the relationships of prospective teachers' pedagogical knowledge structures to performance in a physical education teaching methods class. They used the pathfinder network scaling algorithm to draw out knowledge structures both prior to and after the prospective teachers completed the class. They found that

the prospective teachers' knowledge of key pedagogical concepts was more coherent and corresponded more closely to the instructor's following the courses. Student measures of correspondence and coherence before the class were not significantly correlated with course performance; however, following the class, correlations between these measures and course performance were significant (p. 167).

This implies that prospective teachers' pedagogical knowledge can be trained, and the admission criteria can be one of factors to be better trainee during teacher training period.

A study of teaching behavior exhibited by three tennis coaches was conducted by Stapleton (1983). Stapleton concluded that coaches lacked the pedagogical knowledge required for effective teaching. His results seem to contradict England's (1994) conclusion that experienced tennis teaching professionals displayed high levels
of tennis content knowledge and could transform that content knowledge into pedagogical content knowledge. These contradictory conclusions may be caused by the difference in subjects. Stapleton studied coaches, while England focused on teachers.

Leblond and Soucie (1987) surveyed 82 physical educators, particularly those who were tennis enthusiasts, and found that physical educators felt that they had the technical and pedagogical knowledge required to teach tennis, but that they were prevented from teaching tennis in the high schools because of limited teaching stations combined with large numbers of students in their required classes.

Another study of pedagogical knowledge was conducted by Powell (1991), who examined the growth and development of the pedagogical schemata of sixteen midwestern preservice teachers in a graduate level, secondary alternative certification program. He investigated his subjects' pedagogical knowledge schemata at three stages: when the program began, at the end of student teaching, and trends and changes in the participants' pedagogical schemata as they interacted with the program. Powell found that the subjects showed four stages of pedagogical development throughout the program; atheoretical, theoretical, integrated, and practical schemata. He found that the graduate-level preservice teachers were not informed about students and school environment when they entered the program, and were unaware how to teach a heterogeneous classroom of pupils. The results suggest the importance of having professional teacher preparation before entering the classroom. He asserted that his study provided powerful evidence that "alternative teacher
education programs grounded in conceptual frameworks that define clearly the scope and sequence of the pedagogical knowledge given to preservice teachers will increase the likelihood of being able to chart the growth of that knowledge in preservice teachers over time" (pp. 19-20).

Concentrating on teacher educators rather than teachers, Watts (1984) recommended a national, mandatory, and standardized certification system for teacher educators. An acceptable score on a standardized test of pedagogical knowledge was one of Watts' three requirements for initial certification of teacher educators. The other two were an earned doctorate in education and completion of a minimum of three years successful teaching experience at the elementary or secondary level. It is interesting that Watts emphasized teacher educators' pedagogical knowledge as well as teacher's pedagogical knowledge.

Research on Effective Teaching in Physical Education

Prior to 1960, research on teaching effectiveness focused primarily on identifying teacher personality traits as a means of defining effective teachers. Cruickshank (1990) identified the questions investigated during this period: "To what extent do teacher evaluators agree on the characteristics of good teachers? To what extent do administrators agree when evaluating the same teacher? Can good teachers be separated from poor ones on the basis of such characteristics and ratings?" (p. 67).

The breakthrough in teacher effectiveness research occurred with the onset of the process-product research studies. Prior to
1960, systematic observation of the classroom was uncommon. The process-product studies focused on teacher behavior (what the teacher does) and pupil learning (teacher effectiveness). By observing teachers as they taught real students in real schools a new era of teaching research opened up.

Research on teaching in physical education has produced a significant body of research from the late 1970's to the present. Through improved methods of data collection (Siedentop, 1983) and programmatic lines of research within graduate research institutions (Locke, 1983), valid research findings were produced. In this section, several lines of research on teaching in physical education are reviewed.

Descriptive Studies

Anderson and Barrette's (1978) investigation, known as the Video Bank Project, was the first major descriptive-analytic study. Their strategy was to videotape a multitude of teachers and students at eighty-three different classes. These tapes were then analyzed through a series of systematic observation instruments that categorized teacher and student behaviors into predetermined classifications. This was one of the first large scale programmatic research efforts in the field of research on physical education.

Costello and Laubach (1978) analyzed the videotapes using the Behavior of Students in Physical Education (BESTPED) system, which focused on student behavior. They analyzed the duration of functions for all 193 elementary school physical education students and for the twenty different classes. They found that students spent
sixty-three percent of their time in noninstructional activities such as waiting. Thirty-seven percent was instructional, but only twenty-eight percent of that time was spent in movement related to the accomplishment of various physical education objectives. This implies teachers need to diminish students' noninstructional activities such as waiting time by efficient class organization, well-organized lesson plan, and maximizing the use of available equipment.

In a study focused on teacher behavior, Anderson and Barrette (1978) found that teachers experience over 200 behavioral changes in the course of one class. The teacher did a lot of talking, very little demonstrating and virtually no checking for student understanding.

Cheffers and Mancini (1978) utilized the Cheffers Adaptation of the Flander's Interaction Analysis System (CAFIAS) to explore the interactions that occurred between teachers and students. They found that teachers dominated such interactions and left little or no room for student input relative to feelings or expectations. The student was listening and the teacher was directing.

Hurwitz (1978) did a comprehensive review of the Video Bank Project and classified the results into three themes: pace, models of teaching, and patterns of variability. These findings can inform teacher education by calling for better management routines and organization. He suggested several directions for physical educators: (a) attempts have to be made to develop an underlying structure of all that occurs in physical education classes, (b) studies on the newly developed underlying structure have to be conducted in order to determine what important parts of it not described yet and to work
to develop the lacking descriptive analytic systems, (c) interested persons should be encouraged to apply the newly developed systems, and (d) the application of the systems to other samples of physical education classes should be encouraged.

Research on Academic Learning Time in Physical Education (ALT-PE)

Academic learning time in physical education (ALT-PE) is an area of research that has focused on how much time students spend on activity time in the gym. Borrowing from the generic classroom research of Berliner's time based studies, Siedentop, Birdwell, and Metzler (1979) created the ALT-PE instrument. ALT-PE can be defined as the amount of time a student spends motorically engaged in a relevant task at an appropriate level of success (Siedentop, 1983). ALT-PE gives us a lens through which to examine our own teaching and the teaching of students in field experience settings.

The original ALT-PE instrument underwent various revisions and the second version as described by Rife, Shute and Dodds (1985) was more streamlined and practical. The ALT-PE instrument was used in numerous descriptive studies (Metzler, 1979), intervention studies (Birdwell, 1980), and as a variable in mini process product studies (Metzler 1983; Pieron & Graham, 1984).

Aufderheide (1980) investigated the difference of ALT-PE between regular and mainstreamed handicapped students in physical education and between students taught by users and nonusers of individualized instruction. She found that students taught by individualized instruction users were engaged in a greater
amount of ALT-PE than those who taught by nonusers. However, there was no significant difference of the amount of ALT-PE between regular and mainstreamed handicapped students.

Shute, Dodds, Placek, Rife, and Silverman (1982) investigated ALT-PE using 147 randomized student observations in an elementary physical education classes of one first year teacher. They found no significant difference existed in ALT-PE between male and female groups, between the special needs group and the nonspecial needs group, and among the three skill levels identified for students.

Beamer (1982) attempted to determine how to increase the ALT in two public middle school physical education settings. By observing nine students and two teachers, he found that sixty-eight percent of the total class time was spent in the physical education content and the ALT-PE comprised only fifteen percent of the total class time. He concluded that there was no significant differences in ALT-PE among the three identified student skill levels, and that teacher behaviors did not have much effect on ALT-PE.

Mancini, Wuest, Clark, and Ridosh (1983) compared ALT between low- and high-burnout secondary physical education teachers. They reported that students were engaged in motor activities forty-nine percent of total class time, and engaged in the appropriate motor activity thirty-seven percent of total class time.

Based on the reports of Soar and Soar (1979), Brophy and Evertson (1974), and the Far West Lab study (Fisher and others, 1978), Griffey (1983) inferred a significant feature of ALT in the learning of sport skills and other human movement activities. He asserted that time and learning are not related in a linear
relationship, and he suggested an inverted 'U' effect, which meant that more is not better, and that appropriate amounts of ALT-PE may be more closely linked to achievement.

In 1983, Siedentop (1983) proposed the use of ALT-PE as a means of holding teachers answerable for their teaching. He also admitted to the limitations of ALT-PE by stating that it gives only a slice of reality due to the nature of the interval recording system and doesn't account for the 'competent bystander' (Tousignant & Siedentop, 1983). Proposed improvements of the ALT-PE instrument would be the relating of ALT-PE to the goal of the lesson and the pursuit of content specific versions of the instrument.

As an outsider looking at ALT-PE as an indicator of achievement, Anderson (1983) replied to Siedentop's criticism that it only provides a shadow of reality. He validated the usefulness of ALT-PE and suggested similar improvements relative to content specific versions of ALT-PE and a clearer definition of what is motorically appropriate that would be sensitive to different grade levels.

The studies of ALT-PE have provided us with a body of programmatic research indicating that the manner in which a student spends time in the gymnasium can be correlated with the effectiveness of teaching and student achievement. Parker and O'Sullivan (1983), however, pointed out that "despite the productiveness of ALT-PE to generate useful information about motor skill acquisition, ... it does not discriminate the complexity of the setting nor does it discriminate the frequency of opportunities to respond or the type of skill being employed" (p. 9).
Research on Task Presentation

There is copious research on task presentation in the classroom since Rosenshine and Furst (1971) identified five effective teacher variables that contribute to student achievement. Clarity of task presentation was the first of the variables. Rink (1994) asserted that "clarity of task presentation is one of the most consistent variables identified as being related to teacher effectiveness" (p. 271).

According to Rink (1994) task presentation involves communicating to the learners what they are to do and how they are to do it. She defined task presentation as "an instructional event, usually having several components: a set induction to the practice, the organizational conditions for practice, and the goal of the practice" (p. 270).

Brophy, Rashid, Rohrkemper, and Goldberger (1983) conducted a correlational study of the relationships between classroom teachers' task statements and the degree of student engagement. The teachers' task presentations were classified as positive, negative and neutral. They observed reading and math lessons in six classes. They found that when teachers plunged directly into the task students' engagement was higher than when they began with some kind of presentation statement. When teachers made some statement about the task, students' engagement was low. This results suggest that even the positive teacher presentation statements would not increase student engagement in tasks.

Shemesh and Lazarowitz (1986) investigated the effects on the performance of different age group of students of method of task
presentation in 7th, 9th and 12th grades math classes. They presented tasks in two methods: one was video-taped group demonstration, the other was written questions with graphic illustrations. They analyzed the effect of method of task presentation on the level of task performance by age and gender. They found that the method of tasks’ presentation affected performance of only 7th graders. The 7th graders performed significantly higher in the video-test than in the paper-and-pencil test only.

In physical education, the role of task presentations skills to learning does not have a clear research tradition (Werner and Rink, 1989). Werner and Rink’s (1989) study is one of the early studies on task presentation. They asked four different physical education teachers to teach jumping and landing skills to one of their second grade classes. The teachers’ use of qualitative cues, appropriate number of cues, and the use of visual demonstration coupled with verbal explanation seemed to improve their teaching effectiveness. The researchers report that although accuracy of cues was a major problem for only one teacher initially, giving qualitative information on how to perform was not standard practice for any of the teachers.

An experimental study on task presentation has been done by Kwak (1993) in settings involving lacrosse throwing. 127 eighth grade students were randomly assigned to one of five experimental conditions. The five conditions included: a) no task presentation, b) verbal explanation with partial demonstrations, c) full demonstration only, d) overload verbal explanation with partial demonstrations, and e) verbal explanation with full demonstrations, summary cues, and
verbal/visual rehearsal. The dependent variables were the subjects' scores on measures of accuracy in throwing the lacrosse ball, and their use of appropriate movement process characteristics. The results indicated that the experimental condition of a verbal explanation with full demonstration, summary cues, and verbal/visual rehearsal resulted in the best student performance on each of the dependent measures. This is a strong indication of how to deliver the task presentation in physical education.

Byra and Coulon (1994) compared the instructional behaviors of twelve preservice teachers who taught 25-minute lessons to elementary-age learners. Subjects taught the first lesson with lesson plan but did not teach with lesson plan for the second lesson. The lessons were videotaped and analyzed using the Qualitative Dimensions of Lesson Introduction, Task Presentation, and Lesson Closure (QDITC) that they developed. They found that "in the planned lessons, the preservice teachers presented partial or complete demonstrations and provided qualitative skill cues in more than 80% of their task presentations and specific, congruent feedback in more than 75% of their posttask presentations. In contrast, in the unplanned lessons the preservice teachers presented partial or complete demonstrations and provided qualitative skill cues in less than 50% of their task presentations and specific, congruent feedback in less than 40% of their posttask presentations" (p. 136).

In one of the recent studies by Silverman, Kulinna, and Crull (1995), seven physical education teachers performed pre- and post-tests on their students, with the volleyball forearm pass and underhand serve as tasks. The coding instrument developed by the
researchers was used to observe task presentation and task characteristics. Results showed that "relatively short amounts of time were spent in presenting the task, and combinations of task explicitness that contained all of the outcome, situation, and criteria-product for number and time were positively related to achievement" (p. 37).

Summary

Educational researchers have only recently begun to systematic study on the question of how teachers learn to teach. Based on the results of research on teacher knowledge, it is suggested that teacher knowledge has been correlated both positively and negatively with student achievement (Grossman, Wilson, & Shulman, 1989), because research on teacher knowledge has been conducted by measuring teacher knowledge with different methods.

The main research findings on teachers content knowledge and pedagogical knowledge are:

The development of teachers' content knowledge and its importance have been ignored during teacher preparation.

The variables on teachers' content knowledge have to be considered in designs for research on teaching for a better understanding of teaching effectiveness.

Experienced tennis teaching professionals displayed high levels of tennis content knowledge and could transform that content knowledge into pedagogical content knowledge.
Trained teachers commented an awareness of pedagogical knowledge while untrained teachers devoted most of their comments to content knowledge in the volleyball lessons.

Inaccurate information and general global statements by teachers were not helpful to students and often resulted in inappropriate student responses.

During the high content knowledge lessons, the teaching behaviors of preservice teachers were effective than their low content knowledge lessons.

Deepening teachers' subject matter expertise is a way to improve teaching.

The prospective teachers' knowledge of key pedagogical concepts was more coherent and corresponded more closely to the instructor's following the courses.

Tennis coaches lacked the pedagogical knowledge required for effective teaching.

Preservice teachers in a graduate level showed four stages of pedagogical development throughout the program; atheoretical, theoretical, integrated, and practical schemata.

The Video Bank Project was one of the first large scale programmatic research efforts in the field of research on effective teaching in physical education. ALT-PE study was a breakthrough in physical education teacher effectiveness research. Despite some criticisms of ALT-PE, the studies of ALT-PE have provided us with a body of programmatic research indicating that the manner in which a student spends time in the gymnasium can be correlated with the effectiveness of teaching and student achievement.
Task presentation involves communicating to the learners what they are to do and how they are to do it. The main findings regarding task presentation are:

When teachers plunged directly into the task students engagement was higher than when they began with some kind of presentation statement.

Method of tasks presentation can affect task performance of students by age and gender.

Teachers' use of qualitative cues, appropriate number of cues, and the use of visual demonstration coupled with verbal explanation seemed to improve their teaching effectiveness.

A verbal explanation with full demonstration, summary cues, and verbal/visual rehearsal resulted in the best student performance on measures of accuracy in throwing the lacrosse ball, and their use of appropriate movement process characteristics.

The preservice teachers presented partial or complete demonstrations and provided qualitative skill cues in more than 80% of their task presentations in the planned lessons, while they presented partial or complete demonstrations and provided qualitative skill cues in less than 50% of their task presentations in the unplanned lessons.
CHAPTER 3

METHODS AND PROCEDURES

Chapter three consists of four sections which are presented in the following order: (a) subjects, (b) construction of knowledge tests, (c) data collection and testing procedures, and (d) data analysis procedures.

Subjects

The subjects for this study were fifteen physical education student teachers enrolled in the teacher education program of the physical education department in the College of Education at Chonbuk National University, Korea. All of the subjects were in their senior year and were placed in eleven different junior high or high schools throughout the Chonbuk province for their student teaching.

Students were assigned to schools through the normal procedures for assigning student teachers in the Department of Physical Education. Student teachers taught two to three classes per day for the four week experience. Class size ranged from 40 to 50 students. One class session was 45 minutes for the junior high schools and 50 minutes for the high schools.

All subjects had taken seven required professional courses to acquire a teacher certificate. These courses included Introduction to
Education, Educational Sociology, Philosophy and History of Education, Educational Psychology, Curriculum and Instruction, Educational Evaluation, Educational Administration and Management. The subjects also had completed two methods courses on Instructional Theories of Physical Education and Curriculum Development of Physical Education. Additionally, all the subjects were completing a course entitled Teaching Methods and Materials of Physical Education which included their four-weeks of student teaching practice during their senior year.

Subjects' career goals were varied. Some desired future jobs in teaching, while others were more interested in coaching. Some were involved in the military, and some were preparing for graduate school. The subjects' average age was 24.7. Nine of the subjects were preparing for the Korean National Teacher Examination (KNTE), and six were not. The nine who were preparing for the KNTE did so by means of an informal extracurricular class provided by the Department of Education. Table 3.1 presents the characteristics of the subjects.
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n = 15 \quad M = 24.7

KNTE: Korean National Teacher Examination
P: Student who were preparing for the KNTE
NP: Student who were not preparing for the KNTE

Table 3.1: Subjects’ Characteristics

Construction of Knowledge Tests

**Content Knowledge Test**

A reliable and valid knowledge test was needed to investigate the relationships between the physical education student teacher's content knowledge of volleyball and his/her teaching performance.
Thus, the Level I Test of the United States Volleyball Association (USVBA) Coaching Accreditation Program was used to measure the subjects' content knowledge on volleyball. The USVBA provided the test which was then administered by the researcher. The name of the test was 'Coaching Accreditation Program Level I Test'.

The Level I test consisted of 100 questions. Fifty-two of those questions tested knowledge of content such as skills, tactics, and rules. The remainder of the questions tested coaching strategy. The fifty-two questions related to knowledge of content were selected for use in this study to represent the content knowledge of subjects. Thirty-one of these items were multiple choice. Twenty-one items were true/false. These test items were translated into Korean and were reviewed by two volleyball experts who have taught volleyball classes at the university. One of the experts had a Ph.D in Physical Education, while the other was a candidate for the Ph.D in Physical Education. Minor revisions were made after the review; however, no significant revisions were suggested (see Appendix A).

**Pedagogical Knowledge Test**

In order to measure the subjects' pedagogical knowledge, the Professional Knowledge section of National Teacher Examination (NTE) was used. The purpose of the test was to assess their knowledge of the four major functions of teaching: planning instruction, implementing instruction, evaluating instruction, and managing both learner and environment. The test also assessed knowledge of factors other than direct instruction that influence educational practice and students' learning. Test questions were
designed to represent applications of practice that would be appropriate in a variety of subject-matter situations and grade levels (Educational Testing Service, 1995, p. 28).

The Professional Knowledge portion of the National Teacher Examination consists of three, 30-minutes sections. A fourth section, used for developmental purposes by NTE and not used as part of the scoring, was not utilized in this study. Each section contained thirty five multiple-choice questions, resulting in 105 questions for the complete exam.

All 105 questions were translated into Korean and reviewed by two experts on pedagogy in education who were faculty members of the Department of Education in the College of Education at Chonbuk National University, Korea. Due to cultural differences, thirteen of the 105 questions were replaced with Korean National Teacher Examination questions from corresponding categories at the suggestion of the two scholars (see Appendix B).

Data Collection and Testing Procedures

The data collection process was completed during the fall semester of the 1995 academic year. All of the subjects were student teachers. Data were collected from two written tests, the subjects' volleyball course grades, and videotapes of the subjects' teaching lessons.

Content Knowledge Test and Pedagogical Knowledge Test

Two written tests—the volleyball content knowledge test and the pedagogical knowledge test—were completed before the subjects
were placed in their schools. The interval between the two tests was one week. In other words, the pedagogical knowledge test was administered one week later than the content knowledge test. All the subjects took the tests in the same room at the same time.

Prior to the main tests, a content knowledge pilot test was administered to a group of physical education majors in order to estimate the time needed to take the test and to get feedback on the clarity of the test items. As a result of this pilot test, it was learned that the subjects took 40 minutes to complete the content knowledge test. Minor revisions of the test were then made. Likewise, in the case of the professional knowledge test, a pilot test using the Professional Knowledge test was administered to a group of physical education majors in order to get feedback about the clarity of the test items that were translated into Korean. Again, some revisions of the test were made.

**Test Reliability**

In order to estimate the internal consistency of both knowledge tests, a test and retest method was used. The retests were conducted right after the initial test in order to prevent subjects from having time to learn the answers to the test. The reliability coefficient of the content knowledge test was calculated as .84, while the reliability coefficient of the Professional Knowledge test was calculated as .79. The reliability coefficients were acceptable, because it is agreed that $r = \pm .71$ to $\pm .99$ means high to very high relationships (Gravetter & Wallnau, 1992).
Test Validity

"Content validity is the most important type of validity for knowledge tests" (Harari, 1986, p. 55). The content validity for the content knowledge test derives from the fact that it was used for coaching certification in the USVBA.

Furthermore, Dr. Sheehan (1989) conducted a project sponsored by the USVBA to validate the Coaching Accreditation Program Level I test. On the basis of the project's report, the USVBA has since revised portions of the test at least twice.

Content validity for the pedagogical knowledge test could be obtained because the test was "developed with the assistance of a committee of consultant examiners, composed of teachers and higher education faculty selected specially for that test, working in close collaboration with the test development staff of the Educational Testing Service (ETS)" (Educational Testing Service, 1995, p. 4).

Students' Volleyball Course Grades

Because all the subjects took volleyball I and II as required courses, the subjects' grades from those courses were retrieved. Some subjects had taken another volleyball course as an elective, so the average grades for all volleyball course were used for this study. By permission of the subjects, course grades were collected from their transcripts located in the Department of Physical Education (see Appendix C). According to the course instructor, the evaluation criteria were 70% volleyball skills, 20% content knowledge on volleyball, and 10% attendance and attitude.
Teaching Performances

In order to observe the student teachers' teaching performances, two systematic observation instruments were used; a modified Academic Learning Time in Physical Education (ALT-PE) Micro Computer Data Collection System (see Appendix D) and a modified Qualitative Measures of Teaching Performance Scale (QMTPS) instrument (see Appendix E).

ALT-PE

Teacher use of time was described by the ALT-PE observation instrument. ALT-PE was originally developed and later refined by Siedentop and graduate students at The Ohio State University (Siedentop, Birdwell, & Metzler, 1979; Siedentop, Tousignant, & Parker, 1982) by applying Berliner's (1979) idea of academic learning time in the Beginning Teacher Evaluation Study (BTES). The purpose of the ALT-PE instrument is to measure the portion of time in a physical education lesson that a student is involved in motor activity at an appropriate success rate (Parker, 1989).

ALT-PE was initially conceptualized as an interval recording system, although alternative ways of data collection have since been developed (Metzler, 1990). For this study, an interval recording system was adopted using a modified ALT-PE Micro Computer Data Collection System. The ALT-PE instrument is divided into three main levels: context level, learner engagement level and task difficulty level. More specifically, the system is a three level, hierarchical decision-making system. The first level of the system involves observations of general content and physical education content. In
the second level, the observer has to make a decision regarding learner engagement. On the third and final level, the observer needs to judge the difficulty of the motor activity. The following are descriptions of the categories of ALT-PE excerpted basically from Parker (1989, pp. 196-198). Some category descriptions were modified in consideration of the situation of the Korean physical education class.

**Context Level**

**CONTENT GENERAL**

*Transition* (T): Time devoted to managerial and organizational activities related to instruction.

*Management*: Time devoted to class business that is unrelated to instructional activity.

*Rest* (R): Time devoted to rest and/or discussion of issues unrelated to subject matter.

**CONTENT PHYSICAL EDUCATION**

*Practice* (P): Time devoted to practice of skills or chains of skills outside the applied context with primary goal of skill development.

*Scrimmage* (S): Time devoted to refinement and extension of skills in an applied setting and during which there is frequent instruction and feedback for the participants.

*Game* (G): Time devoted to activities the application of skills in a game or competitive setting when the participants perform without intervention from the instructor.

*Knowledge* (K): Time devoted to transmitting information or knowledge related to physical education content such as the physical form of a motor skill, strategy, rules, social behavior, and background of a subject matter activity.
Non-focused (N): Time devoted to routine execution of physical activities such as warm-up, cool-down, and fitness activities.

Learner Engagement Level
NOT ENGAGED
Waiting (W): The student has completed a task and is waiting for the next instructions or opportunity to respond. Periods of no activity and no movement to activity.

Off Task (O): The student is either not engaged in an activity he or she should be engaged in or is engaged in an activity other than the one he or she should be engaged in.

ENGAGED
Cognitive (C): The student is attentively involved in a cognitive task.

Indirect (I): The student is engaged in a noninstructional aspect of an ongoing activity.

Motor (M): Motor involvement with subject matter-oriented motor activities related to the goals of setting.

Difficulty Level
Appropriate (A): The student is engaged in a subject matter motor activity in such a way as to produce a high degree of success.

Inappropriate (N): The student is engaged in a subject matter-oriented activity, the activity-task is either too difficult for the individual's capabilities or so easy that practicing it could not contribute to lesson goals (Parker, 1989, pp. 196-198).

In the general ALT-PE coding system, three target students are observed in sequence for an entire class period. For this study, however, only one target student was observed because the Korean students were supposed to wear gym suits in physical education class, and the class's large size made it difficult for the observer to easily identify the target student in the video.
In this study, a typical six-second observe/six-second record interval recording technique was used. Two trained observers coded ALT-PE from the videotapes at the same time, under the supervision of the researcher. They used a preprogrammed audiotape which provided observe/record cues to keep observations in the proper order and time.

After completion of the ALT-PE analysis of the videotapes, the videotapes were viewed a second time to record QMTPS analysis.

**QMTPS**

To collect data on task presentation, a modified version of the Qualitative Measures of Teaching Performance Scale (QMTPS) (Werner & Rink, 1989) was used. The researcher modified the original QMTPS to focus on the categories of Type of Task and Task Presentation, rather than Student Responses Appropriate to Task and Teacher Specific Congruent Feedback.

The variables in the type of task construct include informing, refining, extending, repeating, and applying. Variables in the task presentation construct include clarity, demonstration, amount of cues, accuracy of cues, and qualitative cues provided. A length of presentation variable was added. The followings are explanations of the categories of the Qualitative Measures of Teaching Performance Scale (QMTPS) suggested by Rink (1994, pp. 279-280).

**Type of Task**

**Informing:** A Task that names, defines, or describes a skill or movement concept with no focus other than to just do it; usually the first task in a sequence of tasks.
Refining: A task that qualitatively seeks to improve motor performance. Most often this type of task focuses on improving the mechanics of the skill or tactical/strategic aspects of play.

Extending: A task that quantitatively changes the original task content by manipulating the level of difficulty of conditions under which the task is performed or that seeks a variety of responses.

Repeat: A simple repetition of the previous task.

Applying: A task that focuses student performance outside the movement itself. It usually is competitive or self-testing in nature.

Task Presentation
Clarity: Teacher's verbal explanation/directions communicate a clear idea of what to do and how to do it. This judgement is confirmed on the basis of student movement responses to the presentation and is relative to the situation.

Yes: Students proceed to work in a focused way on what the teacher asked them to.
No: Students exhibit confusion, questions, off-task behavior, or lack of intent to deal with the specifics of the task.

Demonstration: Modeling desired performance executed by the teacher, student(s), and/or visual aids.
Yes: Full model of desired performance.
Partial: Incomplete model of task performance exhibiting only a portion of the desired movement.
No: No attempt to model the movement task.

Appropriate number of cues: The degree to which the teacher presents sufficient information about the movement task without overloading the learner.
Appropriate: Three or fewer new learning cues related to the performance of the movement task.
Inappropriate: Either more than three or no new learning cues related to the performance of the movement.
None given: No attempt at providing learning cues.
Accuracy of cues: The degree to which the information presented is technically correct and reflected accurate mechanical principles.

Accurate: All information presented is correct.
Inaccurate: One or more incidences of incorrect information.
None given: No cues given.

Qualitative cues provided: Verbal information on the process or mechanics of movement is provided the learner.

   Yes: Teacher's explanation or direction included at least one aspect of the process of performance.
   No: Teacher's explanation or directions included no information on the process of performance (Rink, 1994, pp. 279-280).

Length of presentation (added): The degree to which the presentation is completed in an appropriate amount of time (Lynn, 1989, p.71).

   Appropriate: Information presented in one to three minutes.
   Too long: Information presented longer than three minutes.
   Too short: Information presented shorter than one minute.

For the QMTPS analysis of the lessons, the videotape was stopped after each task was presented by the student teacher and the type of task was recorded, along with categories of task presentation.

Videotaping the Lesson

Each subject taught three lessons of a volleyball unit. They were asked to teach the same content: forearm pass, overhead pass, and underhand serve for junior high school students, and floater serve for high school students. They were required to submit a lesson plan before each lesson. Permission to videotape the lessons was requested of principals, cooperating teachers, and the subjects themselves. The videotaping schedule was arranged with each
subject and the cooperating teachers via telephone and through visits
during the first week of student teaching.

All three volleyball lessons (45 minutes for junior high school
and 50 minutes for high school) were videotaped using a portable
Sony 8 mm color videocassette camera with a cordless microphone to
allow for accurate coding of QMTfS variables. After the lessons were
videotaped, the 8 mm tapes were duplicated onto VHS tapes in order
to facilitate analyses using a regular VCR. The focus of the camera
was set to take a wide angle view of the class to collect data on both
ALT-PE and QMTfS. All the lessons were videotaped by the
researcher alone, so consistent data could be collected.

Teaching Performance Recording System Training Procedures

Two graduate students at Chonbuk National University, Korea,
one male and one female, were trained to code the videotapes.
During their graduate course work, they had taken a Studies on Sport
Pedagogy class focused on systematic observation. This class was
taught by the researcher. In addition, they completed a one-week
training period which comprised two phases.

In the first phase, the coders were supposed to memorize the
category descriptions of both ALT-PE and QMTfS instruments. After
that, the researcher tested them on their level of memory. During
the second phase, the coders practiced the coding process with the
videotapes until they achieved 80% or more interobserver reliability,
because they were required to reach a criterion level of 80%
reliability for both inter- and intraobserver reliability prior to data
collection. An inter- and intraobserver reliability was calculated using the following general formula:

\[
\frac{\text{agreement}}{\text{agreement} + \text{disagreement}} \times 100 = \text{Percentage of agreement}
\]

After coding all the tapes, randomly selected lessons - one each from subject 7 and subject 15 - were checked for observer drift using a test and retest method.

Data Analysis Procedures

A major assumption of this study was that subjects who scored high on the content knowledge and pedagogical knowledge tests would be more effective teachers than subjects who scored low on the same. Data for subjects were divided into three groups in order to compare the data from each group of teachers for research questions. These groups included an all teachers group, a group of teachers who were preparing for the Korean National Teachers Examination (KNTE-P), and a group of teachers who were not preparing for the Korean National Teachers Examination (KNTE-NP). Data analysis procedures were then developed based on the four research questions.

Research Question #1

What is the volleyball content knowledge of the subjects preservice physical education teachers?
The analysis of the data was presented in a descriptive form. The distribution of test scores, group means and standard deviation was calculated. The subjects' ranks were identified by their test scores. Data were presented for observations of classes taught by groups of subjects.

Research Question #2

What is the general pedagogical knowledge of the subjects preservice physical education teachers?

As with the data in research question number 1, the distribution of test scores, the group mean and standard deviation were calculated. The subjects' ranks were determined by their test results. Data were presented for observations of classes taught by groups of subjects. This mean of pedagogical knowledge test scores was then compared to the mean of NTE scores in the United States.

Research Question #3

How do the student teachers manage and instruct their volleyball classes?

Each category of ALT-PE was converted into a percentage of total lesson time for analysis. Each subject's mean percentage of total QMTPS and single category of QMTPS was calculated, and the Spearman correlation coefficient was computed in order to find the linear relationship between each category of ALT-PE and QMTPS categories. These data were compared to each group of teachers as described above.
Research Question #4

What relationships exist among content knowledge, general pedagogical knowledge, and teaching performance?

Spearman rank-order correlation coefficients were calculated to find the relationship between content knowledge and pedagogical knowledge test scores, between content knowledge test scores and teaching performances, and between general pedagogical knowledge test scores and teaching performances.

In addition, several multiple regression procedures were completed to find relationships among content knowledge, pedagogical knowledge, and teaching performances. These regression procedures included the following: (a) Management, Transition and Waiting as predictors, and content knowledge as criterion, (b) Management, Transition and Waiting as predictors, and pedagogical knowledge as criterion, (c) content knowledge and pedagogical knowledge as predictors, and ALT-PE as criterion, and (d) content knowledge and pedagogical knowledge as predictors, and Total QMTPS as criterion.
CHAPTER 4

RESULTS AND DISCUSSION

This chapter is divided into two sections. The first section presents the inter- and intraobserver reliability measures for this study. The second section presents the analysis of data, and explains the statistical procedures used to find the relationship between the variables in the four research questions. This is followed by the presentation of the results and discussion for each research question. For research question 1, 2 and 3, the data are presented by the three groups: whole subjects, the subjects who were preparing for the Korean NTE (KNTE-P) and the subjects who were not preparing for the Korean NTE (KNTE-NP).

Observer Reliability Test Results and Discussions

Interobserver Reliabilities

An overall 80% interobserver reliability was established as a minimum reliability prior to coding the videotapes. Interobserver reliability was checked after coding one lesson of each subject. Percentage reliabilities for interobserver agreement for ALT-PE coding are presented in Table 4.1. The mean percentages of observer reliability were higher than the established criterion level (80%) for both ALT-PE and QMTPS.

56
Overall, the mean percentages of observer agreement were 86.7% for ALT-PE and 100% for QMTPS. An 100% interobserver agreement was obtained for QMTPS coding. Complete agreement was possible because the researcher and the two coders made a decision on each task presented after the video stopped.
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<td>Game</td>
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--- Behavior was not observed by either observer.
* A percentage below criterion level.

Table 4.1: Interobserver Agreement for ALT-PE Categories by Subjects
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--- Behavior was not observed by either observer.

* A percentage below criterion level.

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<td><strong>Mean Percentage</strong></td>
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--- Behavior was not observed by either observer.
* A percentage below criterion level.

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<td>84.5</td>
<td>86.6</td>
</tr>
<tr>
<td>Non-focused</td>
<td>77.6*</td>
<td>79.6*</td>
<td>79.5*</td>
<td>84.7</td>
</tr>
<tr>
<td><strong>LEARNER ENGAGEMENT LEVEL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waiting</td>
<td>79.5*</td>
<td>81.2</td>
<td>82.6</td>
<td>81.0</td>
</tr>
<tr>
<td>Off task</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Cognitive</td>
<td>86.8</td>
<td>88.4</td>
<td>91.6</td>
<td>87.5</td>
</tr>
<tr>
<td>Indirect</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Motor</td>
<td>85.5</td>
<td>87.8</td>
<td>86.3</td>
<td>85.8</td>
</tr>
<tr>
<td><strong>DIFFICULTY LEVEL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate</td>
<td>89.9</td>
<td>93.8</td>
<td>94.2</td>
<td>93.4</td>
</tr>
<tr>
<td>Inappropriate</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Mean Percentage</strong></td>
<td>85.6</td>
<td>86.4</td>
<td>87.3</td>
<td><strong>86.7%</strong></td>
</tr>
</tbody>
</table>

--- Behavior was not observed by either observer.
* A percentage below criterion level.

Table 4.1: (Continued)
Intraobserver Reliabilities

Intraobserver check for ALT-PE coding was completed for subject 7 and subject 15 using one videotaped lesson each. Percentage reliabilities for intraobserver are presented in Table 4.2. The overall mean percentage of intraobserver agreement was 93.5% for ALT-PE categories.

For an intraobserver agreement for QMTPS coding, two randomly selected lessons were checked by the two coders and the researcher together. Likewise the interobserver agreement, an 100% intraobserver agreement was obtained for QMTPS coding because the researcher and the two coders made a decision on each task presented after the video stopped.

It was confirmed through observer reliability agreement procedures that the data collected using the modified ALT-PE Micro Computer Data Collection System and QMTPS data collection system were reliable. Although there were some categories where the criterion level was not achieved, they still can be considered as reliable sources of data because the percentages of the categories were 75% or higher. Miller (1985) suggested that "Scored-Interval percentages higher than 75% should be considered excellent" (p. 88).
<table>
<thead>
<tr>
<th>Category</th>
<th>Subject 7</th>
<th>Subject 15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Observer1</td>
<td>Observer2</td>
</tr>
<tr>
<td></td>
<td>Observer1</td>
<td>Observer2</td>
</tr>
<tr>
<td><strong>CONTEXT LEVEL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transition</td>
<td>92.3</td>
<td>90.6</td>
</tr>
<tr>
<td>Management</td>
<td>89.8</td>
<td>88.8</td>
</tr>
<tr>
<td>Rest</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Practice</td>
<td>93.6</td>
<td>94.6</td>
</tr>
<tr>
<td>Scrimmage</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Game</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Knowledge</td>
<td>95.7</td>
<td>93.2</td>
</tr>
<tr>
<td>Non-focused</td>
<td>98.1</td>
<td>96.3</td>
</tr>
<tr>
<td><strong>LEARNER ENGAGEMENT LEVEL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waiting</td>
<td>86.8</td>
<td>84.5</td>
</tr>
<tr>
<td>Off task</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Cognitive</td>
<td>96.5</td>
<td>94.3</td>
</tr>
<tr>
<td>Indirect</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Motor</td>
<td>97.7</td>
<td>92.4</td>
</tr>
<tr>
<td><strong>DIFFICULTY LEVEL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate</td>
<td>99.5</td>
<td>96.7</td>
</tr>
<tr>
<td>Inappropriate</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Mean Percentage</td>
<td>94.4</td>
<td>92.4</td>
</tr>
</tbody>
</table>

--- Behavior was not observed by the observer.

Table 4.2: Intraobserver Agreement for ALT-PE
Findings and Discussions for Research Questions

Research Question 1

What is the volleyball content knowledge of preservice physical education teachers?

Content Knowledge Test Results

The scores on the 52-point content knowledge test ranged from 19 to 38, which was from 36.5% to 73.1%. The frequency distribution of the content knowledge scores is visually shown by grouped score in Figure 4.1.

![Bar graph showing frequency distribution of C K Test Scores](image)

Figure 4.1: Frequency Distribution of C K Test Scores
The descriptive statistics summary on the volleyball content knowledge test is presented by groups of subjects in Table 4.3. The percentage of each group was determined by dividing the total possible score (52 points) by the mean score of each group and multiplying the results times 100.

<table>
<thead>
<tr>
<th></th>
<th>Whole (N=15)</th>
<th>KNTE-P (N=9)</th>
<th>KNTE-NP (N=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean raw score</td>
<td>29.4/52</td>
<td>30.1/52</td>
<td>28.3/52</td>
</tr>
<tr>
<td>Percentage</td>
<td>56.5%</td>
<td>57.9%</td>
<td>54.5%</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>5.64</td>
<td>5.84</td>
<td>5.68</td>
</tr>
<tr>
<td>Minimum</td>
<td>19.0</td>
<td>19.0</td>
<td>21.0</td>
</tr>
<tr>
<td>Maximum</td>
<td>38.0</td>
<td>38.0</td>
<td>37.0</td>
</tr>
</tbody>
</table>

KNTE-P: Students who were preparing for the Korean NTE. KNTE-NP: Students who were not preparing for the Korean NTE.

Table 4.3: Content Knowledge Test Scores by Group

The KNTE-P students' score was 1.8 points (3.4%) higher than that of the KNTE-NP students.
The students scored 53.5% in the multiple choice test items, while 67.6% in the true or false test items (see Table 4.4).

<table>
<thead>
<tr>
<th>Type of Item</th>
<th>N</th>
<th>Mean/Total Items</th>
<th>Percentage</th>
<th>Range</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Choice</td>
<td>15</td>
<td>16.6/31</td>
<td>53.5%</td>
<td>11-22</td>
<td>3.58</td>
</tr>
<tr>
<td>True/False</td>
<td>15</td>
<td>14.2/21</td>
<td>67.6%</td>
<td>7-36</td>
<td>6.61</td>
</tr>
</tbody>
</table>

Table 4.4: Mean Scores by Types of Items on C K Test

The Spearman rank-order correlation coefficient between content knowledge test scores and subjects' grades in the volleyball courses was \( r_s = -0.04 \) (\( p < 0.89 \)), which shows there was no relationship between the two variables.

Discussion of the Content Knowledge Test Results

The mean score of the content knowledge test was relatively low compared to the criteria established set by the USVBA Coaching Accreditation Program. The minimum score for passing the test in the program was 80%. Although the primary purpose of the physical education training program is not the preparation of coaches, it is apparent that the preservice teachers were not sufficiently prepared to pass even the Level I test of the USVBA Coaching Accreditation Program.
The fact that the students scored higher in true and false test items than on the multiple choice test items may be attributable to chance rather than their level of content knowledge.

The KNTE-P students scored 30.1 points (57.9%), while the KNTE-NP students scored 28.1 points (54.5%). The KNTE-P students scored slightly higher (1.9 points, 3.4%) than the KNTE-NP students.

No significant relationship (rs = - .04) between the content knowledge test scores and volleyball course grades suggests that knowledge of volleyball was not a major factor in assignment of grades for these courses. This fact was confirmed by the course instructor who indicated that the knowledge portion of the evaluation criteria for the volleyball course was just 20%.

Research Question 2

What is the general pedagogical knowledge of preservice physical education teachers?

Pedagogical Knowledge Test Results

The overall mean score for all subjects on the pedagogical knowledge test was 56.0/105, and the standard deviation was 11.28. The pedagogical knowledge test scores ranged from 38 to 73. The frequency distribution of the professional knowledge test scores is visually presented by grouped score in Figure 4.2.
Figure 4.2: Frequency Distribution of PK Test Scores

The descriptive statistics summary of the general pedagogical knowledge test is presented in Table 4.5. The percentage of each group was determined by dividing the total score (105 points) by the mean score of each group and multiplying the results times 100.
<table>
<thead>
<tr>
<th></th>
<th>Whole (N=15)</th>
<th>KNTE-P (N=9)</th>
<th>KNTE-NP (N=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Score</td>
<td>56.0</td>
<td>64.2</td>
<td>43.7</td>
</tr>
<tr>
<td>Standard Dev.</td>
<td>11.28</td>
<td>4.79</td>
<td>3.93</td>
</tr>
<tr>
<td>Range</td>
<td>35.0</td>
<td>16.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Minimum</td>
<td>38.0</td>
<td>57.0</td>
<td>38.0</td>
</tr>
<tr>
<td>Maximum</td>
<td>73.0</td>
<td>73.0</td>
<td>48.0</td>
</tr>
</tbody>
</table>

Table 4.5: Pedagogical Knowledge Test Scores by Groups

Clearly, students who were preparing for the Korean NTE (KNTE-P) scored an average of 20.5 points (19.5%) higher than those who were not preparing for this test (KNTE-NP). Table 4.8 also indicates these results by percentage.

The pedagogical knowledge test was composed of three sections, all of which dealt with content on planning instruction, implementing instruction, evaluating instruction, managing the instructional environment, professional foundations, and professional functions. The average score was 18.5/35 for the first section, 20.0/35 for the second section and 17.5/35 for the third section. The mean and percentages of these scores are presented in Table 4.6.
<table>
<thead>
<tr>
<th>Section</th>
<th>Whole (N=15)</th>
<th>KNTE-P (N=9)</th>
<th>KNTE-NP (N=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>18.5</td>
<td>21.3</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>15 (12-27)</td>
<td>10 (17-27)</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>4.60</td>
<td>3.43</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>52.9%</td>
<td>61.0%</td>
</tr>
<tr>
<td>Section II</td>
<td>Mean</td>
<td>20.0</td>
<td>22.6</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>13 (14-27)</td>
<td>10 (17-27)</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>4.26</td>
<td>3.36</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>57.1%</td>
<td>65.0%</td>
</tr>
<tr>
<td>Section III</td>
<td>Mean</td>
<td>17.5</td>
<td>20.3</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>13 (10-23)</td>
<td>6 (17-23)</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>4.19</td>
<td>1.73</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>50.0%</td>
<td>58.0%</td>
</tr>
<tr>
<td>Mean</td>
<td>Mean</td>
<td>18.1</td>
<td>21.4</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>13.7</td>
<td>8.7</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>4.35</td>
<td>2.84</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>53.3%</td>
<td>61.3%</td>
</tr>
</tbody>
</table>

Table 4.6: Pedagogical Knowledge Test Scores by Section

The total average score for these Korean students was 9 points lower than the average applicant score (raw score) on the Professional Knowledge section of the NTE Core Battery test (Research & Education association, 1995). The scaled score derived from the 1995 version of the NTE Core Battery of Subject Assessment Tests. Table 4.7 presents a comparison of the two scores.
<table>
<thead>
<tr>
<th></th>
<th>Raw Total</th>
<th>Scaled Score</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects</td>
<td>56</td>
<td>648</td>
<td>53.3%</td>
</tr>
<tr>
<td>Average NTE</td>
<td>65</td>
<td>656</td>
<td>61.9%</td>
</tr>
<tr>
<td>Applicants</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.7: Comparison of Mean Scores between Subjects and NTE Applicants

The nine subjects who were preparing for the Korean NTE scored higher than the six subjects who were not preparing. Table 4.8 presents comparison scores for subjects who were preparing KNTE, not preparing KNTE and NTE applicants. The KNTE-P students scored about the same as the NTE applicants, while the KNTE-NP students scored lower compared to these two groups.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Raw Total</th>
<th>Scaled Score</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNTE-P</td>
<td>9</td>
<td>64.2</td>
<td>655.2</td>
<td>61.1%</td>
</tr>
<tr>
<td>KNTE-NP</td>
<td>6</td>
<td>43.7</td>
<td>633.7</td>
<td>41.6%</td>
</tr>
<tr>
<td>NTE</td>
<td>---</td>
<td>65</td>
<td>656</td>
<td>61.9%</td>
</tr>
</tbody>
</table>

--- Not estimated.

Table 4.8: Comparison of Mean Scores among Subject Groups and NTE Applicants
Discussion of the Pedagogical Knowledge Test Results

The range of the test scores from 38 to 73, was quite wide. This probably resulted from the subjects' different level of preparation for the Korean NTE. Nine subjects were preparing to take the Korean NTE. Once a subject passes this test the Government provides them a teaching position. The students who were not preparing for the KNTE scored lower on the test.

It was not unexpected that the mean of the Professional Knowledge test scores of the NTE applicants would have been higher than that of the Korean preservice teachers overall. The test was created by and for American students and is required to obtain a teaching certificate in the U.S. Therefore, it was assumed that American students would be more prepared to take the test than their Korean counterparts. Moreover, the subjects had either never taken or practiced the U.S NTE test although they had prepared for the Korean NTE test. However, compared to KNTE-P students there was no difference between the score of NTE and KNTE-P (0.8 points, 0.8 scaled score). This suggests that if the KNTE-P students had experience in the U.S NTE, they could have scored higher than they did.
Research Question 3

How do preservice teachers manage and instruct their volleyball classes?

The videotapes on the volleyball lessons were analyzed using ALT-PE and modified QMTPS instruments to investigate student teachers' management and instruction behaviors in their volleyball classes.

ALT-PE Results

<table>
<thead>
<tr>
<th>Category</th>
<th>Mean Percentage</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>14.6%</td>
<td>4.44</td>
<td>14.1 (7.6-21.7)</td>
</tr>
<tr>
<td>Transition</td>
<td>7.1%</td>
<td>2.61</td>
<td>9.7 (1.7-11.4)</td>
</tr>
<tr>
<td>Knowledge</td>
<td>15.2%</td>
<td>7.94</td>
<td>31.9 (3.4-35.3)</td>
</tr>
<tr>
<td>Non-focused</td>
<td>9.6%</td>
<td>2.96</td>
<td>13.4 (3.1-16.5)</td>
</tr>
<tr>
<td>Wait</td>
<td>41.3%</td>
<td>7.40</td>
<td>25.1 (27.4-52.5)</td>
</tr>
<tr>
<td>ALT-PE</td>
<td>12.1%</td>
<td>3.87</td>
<td>13.0 (5.5-18.5)</td>
</tr>
</tbody>
</table>

Table 4.9: Mean Percentages of ALT-PE Categories (N = 15)

The primary categories of ALT-PE instrument were interval recording and converted to percentages. Table 4.9 presents the simple statistics for major categories of ALT-PE.
The mean percentages of ALT-PE categories were also presented visually in Figure 4.3. The column graphs show clear differences in the mean percentages of major ALT-PE categories.

![Bar chart showing mean percentages of ALT-PE categories]

**Figure 4.3: Mean Percentages of ALT-PE Categories**

**Content General Level**

The mean percentage of class time spent in Management was 14.6%. The KNTE-P student teachers spent 13.3% of their class time on Management, as compared to the 16.7% spent by KNTE-NP student teachers (see Table 4.10).
<table>
<thead>
<tr>
<th></th>
<th>Whole (N=15)</th>
<th>KNTE-P (N=9)</th>
<th>KNTE-NP (N=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Means (%)</strong></td>
<td>14.6</td>
<td>13.3</td>
<td>16.7</td>
</tr>
<tr>
<td><strong>Standard Dev.</strong></td>
<td>4.44</td>
<td>4.68</td>
<td>3.42</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>14.1</td>
<td>13.6</td>
<td>9.2</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>7.6</td>
<td>7.6</td>
<td>12.5</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>21.7</td>
<td>21.2</td>
<td>21.7</td>
</tr>
</tbody>
</table>

Table 4.10: Mean Percentages for Management Time

<table>
<thead>
<tr>
<th></th>
<th>Whole (N=15)</th>
<th>KNTE-P (N=9)</th>
<th>KNTE-NP (N=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Means (%)</strong></td>
<td>7.1</td>
<td>8.5</td>
<td>5.0</td>
</tr>
<tr>
<td><strong>Standard Dev.</strong></td>
<td>2.61</td>
<td>2.06</td>
<td>1.84</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>9.7</td>
<td>5.1</td>
<td>4.9</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>1.7</td>
<td>6.3</td>
<td>1.7</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>11.4</td>
<td>11.4</td>
<td>6.6</td>
</tr>
</tbody>
</table>

Table 4.11: Mean Percentages for Transition Time
A relatively small percentage of Transition time was spent by students for all the subjects (7.1%). Transition mean percentages were 8.5% for KNTE-P and 5.0% for KNTE-NP student teachers (see Table 4.11).

The Content General category total mean for all observations was 21.7%. KNTE-P and KNTE-NP teachers' classes spent 21.8% and 21.7% of class time on Content General categories, respectively (see Table 4.12).

<table>
<thead>
<tr>
<th></th>
<th>Whole (N=15)</th>
<th>KNTE-P (N=9)</th>
<th>KNTE-NP (N=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Means (%)</td>
<td>21.7</td>
<td>21.8</td>
<td>21.7</td>
</tr>
</tbody>
</table>

Table 4.12: Mean Percentages for Content General Category Totals
The mean percentages for Content General category totals are also presented visually in Figure 4.4.

![Bar Chart]

Figure 4.4: Comparison of Content General Category Totals

**Content Physical Education Level**

The overall mean percentage for Knowledge was 15.2%. KNTE-P student teachers spent 18.6% of their time on Knowledge, which was the highest percentage among all the groups. The least amount of time, 10.2%, was spent by KNTE-NP teachers (see Table 4.13).
<table>
<thead>
<tr>
<th></th>
<th>Whole (N=15)</th>
<th>KNTE-P (N=9)</th>
<th>KNTE-NP (N=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Means (%)</td>
<td>15.2</td>
<td>18.6</td>
<td>10.2</td>
</tr>
<tr>
<td>Standard Dev.</td>
<td>7.94</td>
<td>7.97</td>
<td>4.98</td>
</tr>
<tr>
<td>Range</td>
<td>32.3</td>
<td>28.7</td>
<td>14.1</td>
</tr>
<tr>
<td>Minimum</td>
<td>3.4</td>
<td>6.6</td>
<td>3.4</td>
</tr>
<tr>
<td>Maximum</td>
<td>35.3</td>
<td>35.3</td>
<td>17.5</td>
</tr>
</tbody>
</table>

Table 4.13: Mean Percentages for Knowledge Time

<table>
<thead>
<tr>
<th></th>
<th>Whole (N=15)</th>
<th>KNTE-P (N=9)</th>
<th>KNTE-NP (N=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Means (%)</td>
<td>9.6</td>
<td>8.8</td>
<td>10.7</td>
</tr>
<tr>
<td>Standard Dev.</td>
<td>2.96</td>
<td>2.87</td>
<td>3.00</td>
</tr>
<tr>
<td>Range</td>
<td>13.4</td>
<td>8.9</td>
<td>8.1</td>
</tr>
<tr>
<td>Minimum</td>
<td>3.1</td>
<td>3.1</td>
<td>8.4</td>
</tr>
<tr>
<td>Maximum</td>
<td>16.5</td>
<td>12.0</td>
<td>16.5</td>
</tr>
</tbody>
</table>

Table 4.14: Mean Percentages for Non-focused Time
Table 4.14 presents the mean percentages of class time spent for Non-focused activity. The mean percentage of time spent in Non-focused activity was 9.6%. Percentages of class time spent on Non-focused activity were: 8.8% in KOTE-P-taught classes and 10.7% in KOTE-NP-taught classes.

The mean percentage of the Content Physical Education category total was 24.8%. The other groups' mean percentages of the Content Physical Education category totals are presented in Table 4.15. The means for the Content Physical Education category totals ranged from 20.9% to 27.4%.

<table>
<thead>
<tr>
<th></th>
<th>Whole (N=15)</th>
<th>KOTE-P (N=9)</th>
<th>KOTE-NP (N=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Means (%)</td>
<td>24.8</td>
<td>27.4</td>
<td>20.9</td>
</tr>
</tbody>
</table>

Table 4.15: Mean Percentages for Content Physical Education Category Totals
In Figure 4.5, the mean percentages for Content Physical Education category totals are illustrated by column graphs.

![Bar chart showing percentages for Whole, KNTE-P, and KNTE-NP categories.]

Figure 4.5. Comparison of Content Physical Education Category Totals

Learner Engagement Level

The major categories of Learner Engagement Level are Waiting and Motor Appropriate which is ALT-PE.

In Table 4.16, the mean percentages of Waiting time are presented. The mean percentage of time spent in Waiting was 41.3%. The range of time spent on Waiting was from 27.4% to 52.5%. More wait time was spent in KNTE-NP teachers' classes (45.0%) than in KNTE-P teachers' classes (38.9%).
<table>
<thead>
<tr>
<th></th>
<th>Whole (N=15)</th>
<th>Kunte-P (N=9)</th>
<th>Kunte-NP (N=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Means (%)</strong></td>
<td>41.3</td>
<td>38.9</td>
<td>45.0</td>
</tr>
<tr>
<td><strong>Standard Dev.</strong></td>
<td>7.40</td>
<td>8.25</td>
<td>4.26</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>25.1</td>
<td>25.1</td>
<td>11.2</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>27.4</td>
<td>27.4</td>
<td>38.4</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>52.5</td>
<td>52.5</td>
<td>49.6</td>
</tr>
</tbody>
</table>

Table 4.16: Mean Percentages for Waiting Time

<table>
<thead>
<tr>
<th></th>
<th>Whole (N=15)</th>
<th>Kunte-P (N=9)</th>
<th>Kunte-NP (N=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Means (%)</strong></td>
<td>12.1</td>
<td>11.7</td>
<td>12.8</td>
</tr>
<tr>
<td><strong>Standard Dev.</strong></td>
<td>3.87</td>
<td>4.61</td>
<td>2.65</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>12.9</td>
<td>12.9</td>
<td>6.4</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>5.6</td>
<td>5.6</td>
<td>9.5</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>18.5</td>
<td>18.5</td>
<td>15.9</td>
</tr>
</tbody>
</table>

Table 4.17: Mean Percentages for ALT-PE
The mean percentage of time spent in Motor Appropriate was 12.1%. KNTE-P teachers taught classes spent slightly less time (11.7%) than KNTE-NP teachers taught classes (12.8%) (see Table 4.17).

The mean percentage of time on Learner Engagement category totals was 53.4%, 50.6% for KNTE-P teachers' taught classes, and 57.8% for KNTE-NP teachers' taught classes (see Table 4.18).

<table>
<thead>
<tr>
<th></th>
<th>Whole (N=15)</th>
<th>KNTE-P (N=9)</th>
<th>KNTE-NP (N=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Means (%)</td>
<td>53.4</td>
<td>50.6</td>
<td>57.8</td>
</tr>
</tbody>
</table>

Table 4.18: Mean Percentages for Learner Engagement Category Totals

The mean percentages for Learner Engagement category totals are presented by using column graphs in Figure 4.6.
Figure 4.6. Comparison of Learner Engagement Category (Waiting, Motor, and Cognitive) Totals

<table>
<thead>
<tr>
<th>Category</th>
<th>Whole (N=15)</th>
<th>Kunte-P (N=9)</th>
<th>Kunte-NP (N=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>14.6</td>
<td>13.3</td>
<td>16.7</td>
</tr>
<tr>
<td>Transition</td>
<td>7.1</td>
<td>8.5</td>
<td>5.0</td>
</tr>
<tr>
<td>Knowledge</td>
<td>15.2</td>
<td>18.6</td>
<td>10.2</td>
</tr>
<tr>
<td>Non-focused</td>
<td>9.6</td>
<td>8.8</td>
<td>10.7</td>
</tr>
<tr>
<td>Wait</td>
<td>41.3</td>
<td>38.9</td>
<td>45.0</td>
</tr>
<tr>
<td>ALT-PE</td>
<td>12.1</td>
<td>11.7</td>
<td>12.8</td>
</tr>
</tbody>
</table>

Table 4.19: Mean Percentages of ALT-PE Categories by Group
In Table 4.19, the mean percentages for all observations by group are presented.

Figure 4.7 presents a visual portrayal of the mean percentages for all observations of all groups.

Figure 4.7. Comparison of Mean Percentages of ALT-PE Categories for All Groups.
Discussion of the ALT-PE Results

First of all, students in the subjects' classes spent little class time on motor activities (12.1%) and spent most of their time waiting. This suggests a lack of managerial or planning skills. The videotapes revealed that teachers failed to utilize equipment efficiently in many cases. They used only a portion of the available balls and nets, so that students regularly waited for turns. The rest of the balls were left on the floor. These problems can be treated by planning the lesson thoroughly, including confirmation of the equipment and facilities available prior to lesson planning.

The teachers spent 15.2% of the time transmitting subject matter knowledge. It was observed that those who scored high on the content knowledge test spent more time transmitting knowledge of volleyball than did those whose scores were lower. The top four scorers on the content knowledge test devoted 20.2% of their time to the knowledge category in their lessons, while the four lowest scorers spent only 16.3% of their time on content knowledge. Although the difference was not big, this may suggest that teachers with strong content knowledge are more likely to spend more time on explanations or demonstrations about what they know.

The indication that teachers who had higher scores on the pedagogical knowledge test had students spending more time in transition is difficult to explain, because it is generally assumed such teachers might spend less management time or transition time. This suggests that a teacher's general pedagogical knowledge by itself is not sufficient for effective teaching.
QMTPS Results

The QMTPS data for the subjects is presented in Table 4.20. The data show the mean scores for each QMTPS category.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Mean (%)</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarity of task presentation</td>
<td>68.9</td>
<td>13.3</td>
</tr>
<tr>
<td>Use of demonstration</td>
<td>35.8</td>
<td>24.7</td>
</tr>
<tr>
<td>Appropriate number of cues</td>
<td>46.7</td>
<td>20.8</td>
</tr>
<tr>
<td>Accuracy of cues</td>
<td>37.5</td>
<td>24.7</td>
</tr>
<tr>
<td>Qualtitative cues provided</td>
<td>51.8</td>
<td>17.1</td>
</tr>
<tr>
<td>Length of presentation</td>
<td>41.9</td>
<td>16.9</td>
</tr>
<tr>
<td>Total QMTPS</td>
<td>46.2</td>
<td>9.8</td>
</tr>
</tbody>
</table>

Table 4.20: Mean Percentages in QMTPS Categories for All Subjects
Figure 4.8 presents the mean percentage of QMTPS in most desirable categories.

![Bar Chart]

**Figure 4.8: Comparison of QMTPS Categories**

A significant picture of the subjects' performance was revealed in QMTPS data. Thirty one percent of their tasks were unclear, and only 35.8% of the tasks were demonstrated fully. More than half of the cues were presented inappropriately; that is, either more than three or no cues at all were provided. Most of the cues (62.5%) which the subjects gave were inaccurate, involving either incorrect
information or no cues given. More than half of the tasks (51.8\%) were presented by providing verbal information on the process or mechanics of movement to the learner. The presentation time was typically either too long or too short based on the standards set in the QMTPS system. Only 41.9\% of the tasks were presented within appropriate span of time.

The mean percentage of all categories of QMTPS measure were produced for the comparison of each group of teachers. Table 4.21 shows the mean percentages for all QMTPS categories by the groups of subjects.

<table>
<thead>
<tr>
<th>Category</th>
<th>Whole (N=15)</th>
<th>KNTE-P (N=9)</th>
<th>KNTE-NP (N=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarity</td>
<td>68.9</td>
<td>73.5</td>
<td>61.0</td>
</tr>
<tr>
<td>Demo.</td>
<td>35.8</td>
<td>41.9</td>
<td>26.5</td>
</tr>
<tr>
<td>Amount</td>
<td>46.7</td>
<td>43.4</td>
<td>51.7</td>
</tr>
<tr>
<td>Accuracy</td>
<td>37.5</td>
<td>47.3</td>
<td>22.7</td>
</tr>
<tr>
<td>Qualitative</td>
<td>51.8</td>
<td>58.4</td>
<td>41.9</td>
</tr>
<tr>
<td>Length</td>
<td>41.9</td>
<td>39.8</td>
<td>44.9</td>
</tr>
<tr>
<td>Total QMTPS</td>
<td>46.2</td>
<td>50.2</td>
<td>40.1</td>
</tr>
</tbody>
</table>

Table 4.21: Mean Percentages of QMTPS Categories by Group
The mean percentages of the QMTPS categories were visually presented in Figure 4.9 in order for the comparison of the groups.

Figure 4.9: Comparison of QMTPS Categories by Group

A salient feature of the observation was that KNTE-P teachers showed a higher mean percentage in all the QMTPS categories except number of cues and length of presentation.

Through linear regression procedure, the following results were found: The clarity of task presentation was positively related to the variable of qualitative cues provided ($r_s = 0.72$, $p < .01$) and negatively related to the variables of appropriate number of cues
(rs = -0.54, p < .05) and length of presentation (rs = -0.65, p < .01) respectively. This suggests that tasks were clear for teachers who provided qualitative cues, however, tasks were unclear for teachers who provided either too many cues of none at all, and who spent too long or too short a time on presentation.

The correlation coefficient between the variables of length of presentation and qualitative cues provided was rs = -0.62 (p<.01), which meant that teachers whose length of presentation was appropriate did not provide qualitative cues. Those who used too many qualitative cues spent too much time on presentation. The total QMTPS was positively related to both demonstration (rs = 0.69, p < .01) and accuracy of cues variables (rs = 0.73, p < .01). This suggests that teachers who did full demonstration and provided accurate cues had a high total QMTPS.

Discussion of QMTPS Results

The subjects' total QMTPS score was 46.2%. This score is comparatively high in relation to data from the Werner and Rink (1989) study in which the teachers' baseline score was 38.0%, but low when compared to teachers' reteach score (59.3%). The highest score was in the category of clarity of task presentation (68.9%). The lowest score was in the category of accuracy of cues (37.5%). Many details of their information cues were incorrect, which implies that the teachers were not sufficiently prepared to teach volleyball content. As discussed earlier in this chapter, the mean score on the volleyball content knowledge test was 29.4 out of 52, which is 56.5% of the test.
The positive relationship between the clarity of task presentation and qualitative cues and the negative relationship between the clarity of task presentation and appropriate number of cues and length of presentation is reasonable. If the number of cues are too many or none are given, then the tasks presented may be unclear. Likewise, if the task presentation is too long or no cues are given, the clarity of task presentation is diminished.

**Research Question 4**

What relationships exist among content knowledge, general pedagogical knowledge, and teaching performance?

To answer this research question, the following four relationships are reviewed and discussed: a) the relationship between content knowledge and pedagogical knowledge, b) the relationship between content knowledge and teaching performance, c) the relationship between pedagogical knowledge and teaching performance, and d) the relationships among content knowledge, pedagogical knowledge and teaching performance. The ALT-PE and QMTPS results represented the teaching performance.

**Relationship between Content Knowledge and Pedagogical Knowledge**

Spearman's rank-order correlation coefficient was calculated to analyze the relationships between the content knowledge test scores and pedagogical knowledge test scores. No significant relationship was found between performance on the two tests. The lack of
relationship between the performances on the two tests was not expected.

One might argue that more intelligent students would have scored higher on both tests, producing a relationship that was attributable to that factor if no other. The fact that the "knowledge" portion of the grade in the volleyball course was so low might have resulted in few students taking the knowledge portion of the course seriously. And, as previously reported, some of the students were preparing for the pedagogically-oriented Korean NTE and performed better on the NTE test than those who were not preparing for the exam. All of these factors, taken together, might have produced this absence of any significant relationship between content knowledge and pedagogical knowledge.

Relationship between Content Knowledge and Teaching Performance

Relationship between Content Knowledge and ALT-PE

The relationship between content knowledge and ALT-PE was analyzed by means of the Spearman correlation coefficient (see Table 4.22).

<table>
<thead>
<tr>
<th>Management</th>
<th>Transition</th>
<th>Knowledge</th>
<th>Wait</th>
<th>ALT-PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CK</td>
<td>-0.25717</td>
<td>0.08871</td>
<td>0.03757</td>
<td>0.32737</td>
</tr>
<tr>
<td></td>
<td>0.3548</td>
<td>0.6427</td>
<td>0.7532</td>
<td>0.8943</td>
</tr>
</tbody>
</table>

Table 4.22: Correlation Coefficients for CK and ALT-PE Categories
Only a very low magnitude relationship between content knowledge and ALT-PE was found ($r_s = 0.33$). This suggests that content knowledge has no effect on ALT-PE or other management variables.

Next, a multiple regression procedure was conducted to increase the accuracy of the prediction. However, no significant relationship between predictor variables of ALT-PE instrument such as management, transition, and wait and content knowledge was found. This is shown in Table 4.23.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Scores</th>
<th>F Value</th>
<th>PR &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>3</td>
<td>44.28038</td>
<td>14.76013</td>
<td>0.405</td>
<td>0.7527</td>
</tr>
<tr>
<td>Error</td>
<td>11</td>
<td>401.31962</td>
<td>36.48360</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C Total</td>
<td>14</td>
<td>445.60000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.23: Analysis of Variance Table for DV Content Knowledge Test

**Relationship between Content Knowledge and QMTPS**

As with the ALT-PE variables, the relationship between content knowledge and QMTPS categories was inconsequential. Overall, although there was a very low positive relationship, no significant relationship between content knowledge and other variables in QMTPS was revealed (Table 4.24).
<table>
<thead>
<tr>
<th>Clarity</th>
<th>Demo.</th>
<th>Amount</th>
<th>Accuracy</th>
<th>Qualitative</th>
<th>QMTPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.29264</td>
<td>0.29982</td>
<td>0.40591</td>
<td>0.29290</td>
<td>0.21288</td>
<td>0.47048</td>
</tr>
<tr>
<td>C K</td>
<td>0.2898</td>
<td>0.2776</td>
<td>0.1333</td>
<td>0.2894</td>
<td>0.4462</td>
</tr>
</tbody>
</table>

Table 4.24: Correlation Coefficients for CK and QMTPS Categories

**Discussion of the Relationship between Content Knowledge and Teaching Performance Results**

Overall, no relationships between content knowledge and any other variables were found. In addition, no relationship between predictors such as management, transition, and wait and content knowledge was found. In other words, content knowledge was not related to any measure from ALT-PE or QMTPS instruments. Earlier, Stroot and Oslin (1993) reported that although preservice teachers had content knowledge, they had a limited ability to apply that knowledge through appropriate pedagogical skills.

**Relationship between Pedagogical Knowledge and Teaching Performance**

**Relationship between Pedagogical Knowledge and ALT-PE**

There were positive relationships between pedagogical knowledge and 'transition time' ($r_s = 0.64$, $p < .01$) and 'knowledge time' ($r_s = 0.57$, $p < .05$) categories of the ALT-PE instrument (see Table 4.25). This suggests that teachers who scored higher spent more time on transition and knowledge.
<table>
<thead>
<tr>
<th></th>
<th>Management</th>
<th>Transition</th>
<th>Knowledge</th>
<th>Wait</th>
<th>ALT-PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PK</td>
<td>-0.22372</td>
<td>0.64037</td>
<td>0.57143</td>
<td>-0.43050</td>
<td>-0.29059</td>
</tr>
<tr>
<td></td>
<td>0.4228</td>
<td>0.0101*</td>
<td>0.0261*</td>
<td>0.1092</td>
<td>0.2934</td>
</tr>
</tbody>
</table>

* p < .05

Table 4.25: Correlation Coefficients for PK and ALT-PE Categories

Next, a multiple regression procedure was performed to examine the relationship between management variables of the ALT-PE instrument such as management, transition, and waiting as predictors and pedagogical knowledge as criterion. As presented in Table 4.26, a significant relationship ($R^2 = 0.58$, p < .05) was found between the predictor variables and the criterion variable.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Scores</th>
<th>F Value</th>
<th>PR &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>3</td>
<td>1032.18479</td>
<td>344.06160</td>
<td>5.047</td>
<td>0.0194</td>
</tr>
<tr>
<td>Error</td>
<td>11</td>
<td>749.81521</td>
<td>68.16502</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C Total</td>
<td>14</td>
<td>1782.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.26: Analysis of Variance Table for DV Pedagogical Knowledge Test

95
Relationship between Pedagogical Knowledge and QMTPS

A significant relationship between pedagogical knowledge and qualitative cues provided was found ($r_s = 0.64$, $p < .05$). No significant relationship was found between pedagogical knowledge and other variables of QMTPS measure (Table 4.27).

<table>
<thead>
<tr>
<th></th>
<th>Clarity</th>
<th>Demo.</th>
<th>Amount</th>
<th>Accuracy</th>
<th>Qualitative</th>
<th>QMTPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>P K</td>
<td>0.40684</td>
<td>0.18362</td>
<td>-0.25247</td>
<td>0.41081</td>
<td>0.63678</td>
<td>0.47713</td>
</tr>
<tr>
<td></td>
<td>0.1305</td>
<td>0.5124</td>
<td>0.3640</td>
<td>0.1282</td>
<td>0.0107*</td>
<td>0.0721</td>
</tr>
</tbody>
</table>

* $p < .05$

Table 4.27: Correlation Coefficients for PK and QMTPS Categories

These data indicate that those who scored high on the pedagogical knowledge test provided the learner with verbal information on the process or mechanics of volleyball activity, while those who scored low did not. Although it was weak ($r_s = 0.47$), it is encouraging that there was a positive relationship between pedagogical knowledge and total QMTPS.

Discussion of the Relationships between Pedagogical Knowledge and Teaching Performance

The teachers who had higher scores on the pedagogical knowledge test tended to have classes that spent more time on transitional and organizational activities and transmitting
information on volleyball knowledge content. In a sense, the results should be the opposite because pedagogical knowledge can be defined as principles intended to guide teachers managerial and instructional practices to promote specific student learning. However, the data indicate that high scorers on the pedagogical knowledge test spent more class time on transition and providing information rather than they did on students' learning activities. There was a low negative relationship between pedagogical knowledge and waiting ($r_s = -0.43$). This can be interpreted to show that those who scored higher on the pedagogical knowledge test had students spend less time waiting than did those with lower scores.

QMTPS results showed that teachers who had higher pedagogical knowledge test scores provided learners with more qualitative cues on volleyball performance than those who scored lower. This result suggests that teachers who had higher pedagogical knowledge test scores were devoted more attention to the process of students' performance than those who scored lower.

An unexpected, significant relationship existed between predictors such as management, transition, and wait and the pedagogical knowledge test, which meant that those who scored higher on the pedagogical knowledge test spent more time on management, transition, and wait. This counterintuitive result suggests that general pedagogical knowledge itself is not sufficient to transform teachers knowledge effectively in terms of teacher use of time.
Relationship among Content Knowledge, Pedagogical Knowledge and Teaching Performance

Relationship between Content Knowledge and Pedagogical Knowledge as Predictors and ALT-PE as Criterion

Multiple regression procedures were used with content knowledge and pedagogical knowledge as the predictors and ALT-PE as the criterion. The results indicated that no relationship existed between the predictors and the criterion (Table 4.28).

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Scores</th>
<th>F Value</th>
<th>PR &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>2</td>
<td>39.49170</td>
<td>19.74585</td>
<td>1.393</td>
<td>0.2856</td>
</tr>
<tr>
<td>Error</td>
<td>12</td>
<td>170.04163</td>
<td>14.17014</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C Total</td>
<td>14</td>
<td>209.53333</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.28: Analysis of Variance Table for CK & PK, and DV ALT-PE

This is unexpected, because it suggests that content knowledge and pedagogical knowledge may not be directly related to ALT-PE measure. Pedagogical knowledge may be related to ALT-PE through factors such as transition and knowledge. Content knowledge, on the other hand, consists of relationships unassociated with ALT-PE categories. The absence of a directly observed relationship between ALT-PE and pedagogical knowledge suggests the need for increased emphasis on pedagogical content knowledge within the teacher education curriculum. Courses devoted to pedagogical content
knowledge should stress the need for combining knowledge with practical teaching skills.

**Relationship between Content Knowledge and Pedagogical Knowledge as Predictors and QMTPS as Criterion**

Multiple regression procedures were used to test the relationship between content knowledge and pedagogical knowledge as the predictors and Total QMTPS as the criterion (see Table 4.29). The result showed a significant relationship between the two variables \( R^2 = 0.41, p < .05 \).

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Scores</th>
<th>F Value</th>
<th>PR &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>2</td>
<td>547.05126</td>
<td>273.52563</td>
<td>4.145</td>
<td>0.0428</td>
</tr>
<tr>
<td>Error</td>
<td>12</td>
<td>791.92607</td>
<td>65.99384</td>
<td></td>
<td></td>
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<tr>
<td>C Total</td>
<td>14</td>
<td>1338.97733</td>
<td></td>
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</tbody>
</table>

Table 4.29: Analysis of Variance Table for CK & PK, and DV Total QMTPS

No significant relationships were indicated by multiple regression procedures that used the same predictors but different other QMTPS categories such as demonstration, appropriate number of cues, accuracy of cues, and qualitative cues provided as criterion.
The sole exception was clarity of task presentation \((R^2 = 0.52, p < .05)\), which suggests that stronger content knowledge and pedagogical knowledge could have a positive effect on the clarity of task presentation. Through knowledge, teachers can present their tasks clearly. These results imply that content knowledge and pedagogical knowledge are related to the Total QMTPS score.

**Discussion of the Relationships among Content Knowledge, Pedagogical Knowledge and Teaching performance**

The results of the multiple regression indicated that the two knowledge test scores were not related to ALT-PE and QMTPS except the categories of total QMTPS and clarity of task presentation. These lack of relationships may be explained as follows: (a) The content knowledge test and the pedagogical knowledge test might be "too far" removed from the ALT-PE and QMTPS measures. This may suggest that other factors exist, such as pedagogical content knowledge, which is "the capacity of a teacher to transform the content knowledge he or she possesses into forms that are pedagogically powerful yet adaptive to the variations in ability and background presented by the students" (Shulman, 1987, p. 15), (b) None of the teachers were teaching well enough to show a relationship with any measure of knowledge as the ALT-PE scores were quite low, although QMTPS scores were closer to Werner and Rink's (1989) data, (c) The volleyball test scores particularly were low and the level of content knowledge might just have been so low that it could not have affected teaching performance, (d) The data suggests through low ALT-PE (12.1%) and high waiting time (41.3%)
that teachers failed to keep students busy, and (e) NTE pedagogical knowledge test may not examine knowledge of variables that are close to the two criterion measures, ALT-PE and QMTPS, because most NTE questions are not directly related to the criterion measures.

Through these observations, some suggestions were made: Teacher educators need to consider which instrument is more sensitive to measuring teaching performance and what aspects of teaching performance can be measured using various instruments.
CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

During the last half century, educational researchers have conducted research on teaching using various research paradigms. Using the Dunkin and Biddle (1974) model, researchers have described and examined relationships among presage, context, process, and outcome variables. Early efforts tried to correlate teacher behavior with student outcomes, as well as describe what teachers did and then what students did in classrooms in a process-product model (Medley, 1985).

Research on teaching in physical education has followed the lead of these more general studies, focusing on teaching effectiveness, process-product studies, teacher behavior research, and teacher-student interaction research. Research on teaching and teacher education has, however, often been conducted without consideration of teacher knowledge. Few studies in physical education teacher education have examined teacher knowledge and its relationship to teaching practice as an important variable in the process of teaching.

Student knowledge and skill acquisition are primary objectives of teaching. Teaching effectiveness research suggests that teachers
must first of all be effective managers (Brophy & Good, 1986), then they must be effective instructors (Rosenshine & Stevens, 1986). Most of the teaching research over the past quarter-century has focused on what teachers can do, rather than what they know. Shulman's (1986a) paradigm for teacher knowledge brought categories of teacher knowledge into the teaching research field. Many critics have suggested that what has been most left-out of this quarter-century of teaching effectiveness research has been the examination of teacher knowledge of subject matter.

Pedagogical content knowledge has been the favorite focus for bringing teacher knowledge back into the research arena. Marks (1991), however, pointed out that pedagogical content knowledge consists of a mix of pedagogical knowledge, content knowledge, and knowledge of learners, thus causing definitional ambiguity and potential confusion. While it is clear that pedagogical content knowledge should continue to be a focus for teaching research, it is also clear that examination of pedagogical knowledge and content knowledge, both capable of valid and reliable measurement, should also be included in teaching research. It was under this rationale that this study focused on teacher knowledge of a specific, physical education subject matter (volleyball) and general pedagogical knowledge, and how these variables related to two overall measures of teaching performance, ALT-PE and QMTPS.

The purpose of this study was to examine the relationships among content knowledge, pedagogical knowledge and the teaching performance of physical education student teachers. More specifically, the relationships among the subjects' knowledge of
volleyball, general pedagogical knowledge, and teaching performance measured by a modified ALT-PE and modified QMTPS instrument were examined.

This study was an effort to answer the following research questions:

1. What is the volleyball content knowledge of preservice physical education teachers?
2. What is the general pedagogical knowledge of preservice physical education teachers?
3. How do preservice teachers manage and instruct their volleyball classes?
4. What relationships exist among content knowledge, general pedagogical knowledge, and teaching performance?

Fifteen subjects volunteered to participate in this study. All were physical education student teachers enrolled in the teacher education program of the physical education department in the College of Education at Chonbuk National University, Korea.

All subjects were given a volleyball content knowledge test and a general pedagogical knowledge test in controlled settings. The U.S. Volleyball Association's Coaching Accreditation Program Level I Test was used to test the subjects' content knowledge, while the Professional Knowledge section of National Teachers Examination was used to test their pedagogical knowledge. In addition, the subjects' volleyball course grades were collected. During their student teaching period, a total of forty-five teaching lessons were videotaped to analyze their teaching performances by means of modified ALT-PE and modified QMTPS instruments.
Descriptive statistics were used to analyze the data. Relationships among the variables were investigated by using the Spearman rank-order correlation coefficient. Multiple regression procedures were used for predictions of the relationships between combinations of predictors and criterion.

Summary of Key Findings and Conclusions
The conclusions of the study were presented in accordance with the four research questions.

Research Question 1
What is the volleyball content knowledge of preservice physical education teachers?

1.1 The content knowledge test scores of the student teachers ranged from 19 to 38 from a total of 52. The mean score of the student teachers was 29.4 points, which was 56.5%, and standard deviation was 5.64.

1.2 The student teachers who were preparing for the Korean National Teacher Examination (KNTE-P) scored 1.8 points (3.4%) higher than that of the student teachers who were not preparing for the Korean NTE (KNTE-NP).

1.3 The teachers scored 53.5% in the multiple choice test items, while scoring 67.6% in the true or false test items.

1.4 No statistically significant relationship was found between a content knowledge test score and a volleyball course grade.
In summary, the fact that preservice teachers failed to score the minimum 80% indicates that they were not well enough prepared to pass even the Level I test of the program.

No significant relationship ($r_s = - .04$) between the content knowledge test scores and volleyball course grades was found. This suggests that knowledge of volleyball was not a major factor in terms of course grading.

**Research Question 2**

What is the general pedagogical knowledge of preservice physical education teachers?

2.1 The mean score of the pedagogical knowledge test was 56.0 of 105 points and the standard deviation was 11.28. The scores ranged from 38.0 to 73.0 points.

2.2 KNTE-P teachers scored 20.5 points (19.5%) higher than that of KNTE-NP teachers, which is a considerable margin.

2.3 The teachers got relatively consistent scores throughout each of the three sections of the test.

2.4 The total average score was 9 points (8.6%) lower than the American applicants' average score on the Professional Knowledge section of the NTE Core Battery test. However, KNTE-P students achieved almost the same average score as NTE applicants. The scaled score of KNTE-P students was 655.2 (61.1%), while that of the NTE applicants was 656 (61.9%).

In summary, the level of general pedagogical knowledge of Korean preservice teachers was lower than that of the American NTE
applicants. However, due to the subject size of this study, this finding can not be generalized. The big margin between KNTE-P students and KNTE-NP students is strictly a consequence of the students' levels of preparation.

**Research Question 3**

How do preservice teachers manage and instruct their volleyball classes?

3.1 The student teachers spent 14.6% of class time for Management, 7.1% for Transition, 15.2% for Knowledge, 9.6% for Non-focused, 41.3% for Waiting, and 12.1% for ALT-PE.

3.2 KNTE-P teachers' classes spent 13.3% and KNTE-NP teachers' classes spent 16.7% of class time for Management.

3.3 KNTE-P teachers' classes spent 8.5% and KNTE-NP teachers' classes spent 5.0% of class time for Transition.

3.4 The Content General total mean for all teachers was 21.7%, for KNTE-P teachers was 21.8%, and for KNTE-NP teachers was 21.7%.

3.5 KNTE-P teachers' classes spent 18.6% and KNTE-NP teachers' classes spent 10.2% of class time for Knowledge.

3.6 KNTE-P teachers' classes spent 8.8% and KNTE-NP teachers' classes spent 10.7% of class time for Non-focused.

3.7 The Content Physical Education category total mean for all teachers was 24.8%, for KNTE-P teachers was 27.4%, and for KNTE-NP teachers was 20.9%.

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3.8 KNTE-P teachers' classes spent 38.9% and KNTE-NP teachers' classes spent 45.0% of class time for Waiting.

3.9 KNTE-P teachers' classes spent 11.7% and KNTE-NP teachers' classes spent 12.8% of class time for ALT-PE.

3.10 The Learner Engagement total mean for all teachers was 53.4%, for KNTE-P teachers was 50.6%, and for KNTE-NP teachers was 57.8%.

In summary, the students in these teachers classes spent too little class time on student motor activities (12.1%), while they spent too much time for waiting (41.3%). The teachers failed to efficient use of available equipment and to manage classes effectively. Teachers who scored higher on content knowledge spent more time for Knowledge (20.2%) than the teachers who scored lower (16.3%). This suggests that teachers who possess more content knowledge are more likely to spend more time for transmitting subject matter knowledge.

3.11 The mean percentage of QMTPS in most desirable categories was 68.9% on Clarity of task presentation, 35.8% on Use of demonstration, 46.7% on Appropriate number of cues, 37.5% on Accuracy of cues, 51.8% on Qualitative cues provided, 41.9% on Length of presentation, and 46.2% on Total QMTPS, respectively.

3.12 The observed mean percentage of Clarity of task presentation was 73.5% for KNTE-P teachers and 61.0% for KNTE-NP teachers.

3.13 The observed mean percentage of Demonstration was 41.9% for KNTE-P teachers and 26.5% for KNTE-NP teachers.
3.14 The observed mean percentage of Appropriate number of cues was 43.4% for KNTE-P teachers and 51.7% for KNTE-NP teachers.

3.15 The observed mean percentage of Accuracy of cues was 47.3% for KNTE-P teachers and 22.7% for KNTE-NP teachers.

3.16 The observed mean percentage of Qualitative cues provided was 58.4% for KNTE-P teachers and 41.9% for KNTE-NP teachers.

3.17 The observed mean percentage of Length of presentation was 39.8% for KNTE-P teachers, and 44.9% for KNTE-NP teachers.

3.18 The observed mean percentage of Total QMTPS was 50.2% for KNTE-P teachers and 40.1% for KNTE-NP teachers.

3.19 The Clarity of task presentation was positively related to Qualitative cues provided ($r_s = 0.69$, $p < .01$) and negatively related to Appropriate number of cues ($r_s = -0.54$, $p < .05$) and Length of presentation ($r_s = -0.65$, $p < .01$).

3.20 Significantly negative relationship was found between Length of presentation and Qualitative cues provided ($r_s = -0.62$, $p < .01$).

3.21 Significantly positive relationship was found between Total QMTPS and Demonstration ($r_s = 0.69$, $p < .01$), and between Total QMTPS and Accuracy of cues ($r_s = 0.73$, $p < .01$).

In summary, KNTE-P teachers showed higher mean percentage in all QMTPS categories except in the category of Appropriate number of cues and Length of presentation. Their presentations were clear and involved full demonstrations. Their information was accurate and they often provided qualitative cues. As a consequence,
their total QMTPS was highest (50.2%) among the groups. In other words, KNTE-P teachers' mean percentages in overall ALT-PE measures were not higher compared to other groups, but in overall QMTPS categories, they showed a higher mean percentage. This suggests that KNTE-P teachers' pedagogical knowledge may contribute to their teaching performance in terms of the QMTPS measure.

**Research Question 4**

What relationships exist among content knowledge, general pedagogical knowledge, and teaching performance?

4.1 No significant relationship was found between content knowledge test scores and pedagogical knowledge test score of the student teachers.

4.2 A very low relationship was found between content knowledge test scores and ALT-PE ($r_s = 0.33$) of the student teachers.

4.3 No significant relationship was reported between categories of ALT-PE and content knowledge test scores of the student teachers.

4.4 No significant relationship was found between categories of QMTPS and content knowledge test scores of the student teachers.

4.5 Significant relationship was found between pedagogical knowledge test scores of the student teachers and Transition ($r_s = 0.64$, $p < .01$), and between pedagogical knowledge test score and Knowledge ($r_s = 0.57$, $p < .05$).
4.6 Fifty-eight percent of the variance in the pedagogical knowledge test score was explained by predictor variables such as Management, Transition, and Waiting ($R^2 = 0.58$). This indicates that Management, Transition, and Waiting is a powerful influence on pedagogical knowledge test scores.

4.7 Significant relationship was found between pedagogical knowledge test score and Qualitative cues provided ($rs = 0.64$, $p < .05$). No significant relationship was reported between pedagogical knowledge test score and other QMTPS categories.

4.8 No significant relationship was found content knowledge, pedagogical knowledge and ALT-PE categories.

4.9 Forty-one percent of the variance in the total QMTPS was explained by predictor variables of content knowledge and pedagogical knowledge score of the student teachers ($R^2 = 0.41$, $p < .05$).

In summary, no relationship was reported between content knowledge and ALT-PE or QMTPS. This may mean that content knowledge test score was too low to relate to ALT-PE or QMTPS, or the student teachers were not seriously teaching to teach volleyball.

Teachers who scored high on the pedagogical knowledge test spent more class time on transition and provided more information than they spent on students' learning activities. Teachers who scored high on the pedagogical knowledge test spent less class time with students' Waiting.

Teachers who scored higher on the pedagogical knowledge test provided learners with more verbal information on the process of volleyball performance, while those who scored lower provided less.
Both content knowledge and pedagogical knowledge are more related to QMTPS than ALT-PE, and no positive relationship exists between ALT-PE and QMTPS measure.

Although no relationship exists between content knowledge and general pedagogical knowledge, findings from the multiple regressions showed significant relationship between the teachers' content knowledge and general pedagogical knowledge and Total QMTPS and Clarity of task presentation.

It is difficult to reach a summary conclusion based on these data. The lack of significant results in relationships among content knowledge, pedagogical knowledge, and teaching performance are counterintuitive. It may be that the tests, which concentrate on presage variables, are "too far" from the actual performance of teachers and the process behaviors of students (process variables), a particular research problem argued by Medley (1985).

The teaching performance data revealed too much waiting time and too little student involvement. It is impossible to judge whether these performances showed a lack of pedagogical or content knowledge or whether students simply did not have the previous practice in applying this knowledge to demonstrate a relationship. What the results do suggest is that teacher performance should be a primary focus of teacher education and that the relationship between knowledge and performance needs to be "connected" in actual teaching practice. It may be that these students have had insufficient practice prior to student teaching to make those "connections".
Recommendations for Future Research

In order to further examine the relationships among teachers' content knowledge, pedagogical knowledge, and their teaching performance, the following recommendations are suggested:

1. Comprehensive evaluation of teachers' content knowledge is needed to understand the level of teachers' knowledge and the role of content knowledge in teaching.

2. As indicated in this study, the Korean teachers' level of content knowledge and pedagogical knowledge was lower than that of the American teachers. Using a larger number of subjects, comparative study on the level of teachers' knowledge and their teaching performance is needed.

3. Although definitional ambiguity exists, the relationship between pedagogical content knowledge and teaching performance should be studied. Also, the relationships among content knowledge, pedagogical knowledge, pedagogical content knowledge, and teaching performance should be examined.

4. Some studies were attempted in order to investigate how teachers' knowledge affects student achievement. However, these studies were conducted under lab-controlled settings or using relatively few subjects. Ultimately, experimental studies which are performed in regular classrooms or gyms are necessary to examine the effects of teacher knowledge on teaching effectiveness and student achievement.

5. Even if it may be difficult to accomplish, a study is needed to investigate how teacher educators' knowledge affects their students' knowledge. Such a study might begin by regularly
administering interrelated knowledge tests to teacher educators and their students and carefully recording the results over an extended period of time. This study is important, because it is assumed that the quality of teacher education depends to a certain extent on the quality of teacher educators' teaching.

It is generally recommended for the improvement of the teacher education program. Although the results of this study may not indicate the importance of such a focus, the teacher education program should provide a deep knowledge base to connect knowledge with teaching performance. This process will help preservice teachers bridge the gaps between theory and practice.
LIST OF REFERENCES


Appendix A

A - 1: Content Knowledge Test

A - 2: Translation of the Content Knowledge Test

* The content knowledge test on volleyball is available from USA VOLLEYBALL NATIONAL OFFICE. The address is 3595 East Fountain Blvd., Suite I-2, Colorado Springs, CO 80910-1740.
Appendix B

B - 1: Pedagogical Knowledge Test
B - 2: Translation of the Pedagogical Knowledge Test

* This test was excerpted from NTE Core Battery Subject Assessment Tests (1995) by Research & Education Association, Piscataway, New Jersey.
B - 1. General Pedagogical Knowledge Test
NTE CORE BATTERY
TEST OF PROFESSIONAL KNOWLEDGE

Section 1

TIME: 30 Minutes
35 Questions

DIRECTIONS: Each of the following questions and incomplete statements is followed by five answer choices. Select the choice which best answers each question.

1. New teachers may have a more difficult time learning to identify potentially gifted children. This is due primarily to
   (A) conflicting research data.
   (B) pressure from parents who think their child is gifted.
   (C) unreliable or invalid test scores.
   (D) lack of teaching experience.
   (E) classroom mood and/or environment.

2. If you are conducting a laboratory experiment in science class you would be implementing which means of instruction most?
   (A) Deduction
   (B) Unitization
   (C) Discrimination
   (D) Automaticity
   (E) None of the above.

3. When the teacher wants a higher order response from the students he will probably
   (A) not accept all short responses.
   (B) make the statement lengthy with more sophisticated vocabulary.
   (C) restate the question and ask a left-brain preference student.
   (D) ask students to write down their responses and then read them aloud.
   (E) ask for additional information.
4. Bloom's taxonomy represents six levels of thinking opportunities for students. Each level gives teachers opportunities to formulate summative and formative, convergent and divergent questions. The first level (knowledge) questions are primarily.
   (A) summative and divergent. (D) convergent.
   (B) memory. (E) synthesis.
   (C) divergent.

5. There are some isolated situations, in which, despite conscientious planning and good lesson presentation, the students are unable to learn certain material. This is especially true in the lower grades. When this occurs.
   (A) the teacher should re-evaluate the entire lesson plan and re-introduce it at a later time.
   (B) the objective was inappropriate.
   (C) they are not ready for the concept developmentally, so the teacher should give up.
   (D) the learners have insufficient previous knowledge.
   (E) the strategies and methods were inappropriate.

6. Teachers who receive merit pay have
   (A) taught ten years or more in the same school district.
   (B) evidence of higher achievement scores for their students.
   (C) greater enthusiasm and fewer discipline problems in the classroom.
   (D) attended many in-school workshops for staff.
   (E) demonstrated excellent performance consistently.

7. The emphasis on correlating studies is a concept in understanding the relationship of
   (A) a child's development to curriculum.
   (B) the amount of financing to literacy.
   (C) social life to economic level.
   (D) economics to literacy.
   (E) teachers of one discipline to teachers of another.

8. When we consider behavioral objectives we are looking at
   (A) what the teacher should do to see that learning occurs.
   (B) the lesson plan that is taught.
(C) what a student should be able to do upon completion of instruction.
(D) a statement of what students and teachers should do.
(E) None of the above.

9. The adverse reaction of educators toward merit pay says it will reduce
   (A) effort by average teachers.
   (B) cooperation and communication of teachers.
   (C) salaries of the rest of the teachers.
   (D) respect for all colleagues whether on merit pay or not.
   (E) students' respect for teachers.

10. Low income minority students may be difficult for teachers to
    understand and motivate because of
    (A) disinterested parents.  (D) too difficult a curriculum.
    (B) high absenteeism.  (E) outside peer pressure.
    (C) language and cultural differences.

11. The learning process used by teachers which is capable of
    molding our responses without any direct reinforcement is
    referred to as
    (A) operant extinction.  (D) modeling or imitating.
    (B) operant conditioning.  (E) None of the above.
    (C) operant shaping.

12. The United States Supreme Court has held that students may
    (A) not be subject to corporal punishment.
    (B) be expelled from school but for no longer than 10 days.
    (C) withdraw from school at age 15 if employed.
    (D) have their driver's license suspended if under 18 years old
        and they drop out of school.
    (E) wear buttons that promote political issues.

13. John Dewey's philosophy of education would have stated that
    the purpose of education is
    (A) the personal and social growth of the individual.
    (B) that all the time should be spent on academic development.
    (C) that science should have the major emphasis in the curriculum.
(D) that morals should be taught extensively.
(E) that the humanities should have the major emphasis in the curriculum.

14. Objectives, supplementary materials, teaching strategies, and activities are part of the
(A) short-term plan. (D) unit plan.
(B) daily plan. (E) curriculum.
(C) calendar plan.

15. Citizen advisory committees are sometimes used in local schools. Which of the following would be the most appropriate function for a high school advisory committee?
(A) evaluate teachers for tenure.
(B) screen complaints about school library books.
(C) raise money for school athletics.
(D) encourage the school board to increase the percent of the school district budget spent on the high school.
(E) review the school curriculum and suggest priorities for curriculum improvement.

16. Planning procedures are an important part of the science teacher's skills. When he/she directs a pre-teaching activity it is intended to
(A) reflect the student's product and process skills for science.
(B) provide information for writing the science objectives.
(C) motivate the students to study science.
(D) All of the above.

17. An integral part of teleconferencing is
(A) direct teaching. (D) strategic teaching.
(B) achievement scores. (E) group discussion.
(C) distance education.

18. Research of John Goodlad indicated student talk in the classroom takes up less than what percentage of the instructional time?
(A) 50% (D) 2%
(B) 6% (E) 10%
(C) 20%
19. Critiquing language arts lessons is a culminating step in the planning procedure. Lesson critiques are most beneficial for
(A) the teacher to plan more effectively.
(B) the teacher and the students to determine goal achievements.
(C) the students to determine what they learned.
(D) the students to determine their goals.
(E) the students to determine their teacher's methods.

20. Teachers have to deal with the many pressures children face in the world which lead to
(A) high interest in school work.
(B) having knowledge of a particular subject.
(C) readiness to set new goals and challenges.
(D) having knowledge of the world.
(E) lowered self esteem.

21. If a teacher has determined that punishment is necessary, which of the following are appropriate guidelines for punishing students?
I. Let students know what behavior will be punished before administering any punishment.
II. Punish only about every third time the behavior occurs so the students being punished won't believe you are making an example of them.
III. Punish immediately following the inappropriate behavior.
IV. The teacher should explicitly identify for the student the behavior that is to change as a result of the punishment.
(A) I and II only.
(B) III and IV only.
(C) I, II and III only.
(D) I, III and IV only.
(E) II, III and IV only.

22. During June, 1990, the United States Supreme Court ruled that which of the following groups could use public school facilities to hold meetings?
(A) Prayer groups
(B) Science clubs
(C) Chinese students
(D) Young Republicans
(E) Junior Achievement

23. To facilitate learning a teacher must
(A) properly use different forms of teaching strategies.
(B) be able go successfully use direct and indirect teaching.
(C) be successful working with group and individual students.
(D) All the above.
(E) Only (A) and (B).

24. The learning stations approach allows many students to experience many materials in a given period of time. From a behavioral standpoint, which student would need the most teacher reinforcement to be successful?
(A) An auditory learner
(B) A learning disabled student
(C) A student who is chronically off-task
(D) The student who does average work
(E) A quiet, yet gifted, student

25. United States educators have decided that Japanese education.
(A) should be a model for U.S. education.
(B) is of better quality than U.S. education.
(C) should not be a model for the U.S.
(D) doesn't place enough pressure for students.
(E) is "on par" with U.S. education.

26. Which of the following are characteristics of norm-referenced test?
I. Students are compared to a set of standards.
II. Students must demonstrate skills on the test at some predetermined level.
III. Students compete against other students.
IV. Used to determine if students are in the top 20% of a class.
(A) I only.  (D) III and IV only.
(B) I and II only.  (E) II, III and IV.
(C) III only.

27. Public Law 95-56(1978) makes provisions for the gifted and talented, since the law states that schools will identify and provide them with appropriate education. Yet some schools do not because.
(A) it would mean additional trained staff, facilities, testing and identifying efforts, and establishing objectives and goals for their program.
(B) parents may complain if their child is not identified as gifted.
(C) administrators think it will cost them extra money and they have teachers that do not want the gifted pulled from their rooms.
(D) it is easier to ignore the gifted and let them read library books or help the slow learner.
(E) gifted students often teach themselves and therefore require less teacher interaction.

28. In order for a teacher to identify the distinguishing characteristics of at-risk students, he/she must recognize their
   (A) high self-esteem.
   (B) low education grades and scores.
   (C) good home environment and support.
   (D) high interest in all courses.
   (E) hostile behavior.

29. The career ladder concept is based upon the assumption that
   (A) teachers stay too long in the classroom and need to move on to other jobs in the school system.
   (B) good teachers should be rewarded at a level that would make them want to stay in the classroom.
   (C) teachers will use and support most of the present teacher evaluation systems.
   (D) good teachers will make good administrators so a career path into school administration should be made available.
   (E) persons with college degrees, but not teacher certification, should be given a shorter route to become certified and start a teaching career.

30. Teachers group students for many reasons, and they use different types of groups. Which of the following would be the best placement for a student from a culturally deprived situation who also has a language barrier?
    (A) A panel with low achievers
    (B) A project group
    (C) A research group
    (D) A group which has the teacher as a member
    (E) A discussion group that is heterogeneous
31. When Thorndike developed the stimulus-response theory of learning, it helped to derive his Law of Effect. A student receives an A on a math test. Receiving the good grade serves as
(A) a stimulus.
(B) a sign that the student studied.
(C) a sign that learning has occurred.
(D) an effect.
(E) Only (A), (B) and (C).

32. Poor teachers will use only the curriculum guide and textbooks provided by the school because
(A) it is a sign of being a cooperative teacher.
(B) they lack motivation, enthusiasm, and love for teaching.
(C) they may be accused of teaching the wrong thing if they add enrichment materials or knowledge.
(D) they feel it gives adequate material and knowledge for the age they are teaching.
(E) they must be accused of subjecting students to an "information overflow".

33. New teachers are encouraged to follow the text closely the first few years of teaching. This is recommended
(A) to build self-confidence in teaching.
(B) to establish the pattern of teaching the required curriculum.
(C) to build an awareness of and appreciation for established skills.
(D) All the above.
(E) None of the above.

34. A major advantage identified in support of team teaching at the high school level is that
(A) it allows teachers to better understand individual children.
(B) it will reduce school instructional costs.
(C) it utilizes the special competencies and strengths of teachers.
(D) it is easier to build into the master schedule.
(E) it has consistently resulted in students having higher achievement test scores.
35. It was in 1837 that kindergarten was founded by
   (A) Piaget.  
   (B) Hutchins.  
   (C) Herbart.  
   (D) Froebel.  
   (E) Montessori.
Section 2

TIME: 30 Minutes
35 Questions

DIRECTIONS: Each of the following questions and incomplete statements is followed by five answer choices. Select the choice which best answers each question.

1. What approach has been successful for student-centered teaching?
   (A) Team-teaching
   (B) An authoritarian teacher in the control
   (C) Small group activities with little guidance or supervision by the teacher
   (D) Provide structured activities so the students do not have to use their abilities in applying concepts
   (E) Promoting development of higher cognitive growth

2. A student with severe behavior problems may be able to be successful in the regular classroom. What special modifications may be needed?
   (A) Modifications are not needed.
   (B) More frequent praise and reinforcement is needed.
   (C) Instruct other students to intentionally ignore their peer.
   (D) Focus the attention of other students on the peer.
   (E) Distance the student.

3. When a teacher is the center of the classroom activity, what approach is being used?
   (A) Discovery approach
   (B) Unfocused discussion
   (C) Indirect instruction
   (D) Small group activity
   (E) Direct instruction

4. Approaches to gifted education does not include which one of the following?
   (A) Advance at a rate that everyone in class can master
   (B) Group students by ability so they can achieve and be challenged
   (C) Provide enriched learning experiences in one or more
subjects
(D) Emphasize accelerating students' progress in special programs or special in-class activities
(E) Provide opportunities for out-of-class learning

5. Excellent student involvement occurs when
(A) administrators decide a plan.
(B) the teacher decides on a plan.
(C) the students decide on a plan.
(D) the teacher and students decide on a plan its implementation.
(E) the teacher and administrators decide on a plan and its implementation.

6. When writing a daily lesson plan you should include
(A) questions you want to ask to check for comprehension.
(B) anticipatory activity or lesson opener.
(C) objectives and means to obtain them.
(D) All the above.
(E) Only (B) and (C).

7. Obtaining background information is necessary to determine what knowledge the student already possesses. This is which step of the lesson critique stage?
(A) Teacher activities
(B) The objectives
(C) Instructional procedures
(D) Teacher preparation
(E) Means of closure

8. A developmentally appropriate curriculum for young children would include a major emphasis upon
I. learning experiences that include physical activity.
II. questions emphasizing convergent thinking.
III. students learning to be quiet, orderly and attentive.
IV. using manipulative materials.
(A) I and II only
(B) I and III only.
(C) I and IV only.

9. The pay of most teachers in the United States is determined by the single salary schedule. Which of the following items are considered in determining each individual teacher's salary on
the single salary schedule?
(A) Test performance of pupils and years of teaching experience
(B) Years if teaching experience and the teacher's level of education
(C) Pupils' test performance and principal's ratings of teachers
(D) The teacher's level of education and peer ratings
(E) Principal's ratings and peer ratings

10. Horace Mann is recognizes as
(A) the leading advocate of private schools for religious education.
(B) an advocate of westward expansion.
(C) the founder of the common school movement to fund free elementary schools open to all students.
(D) the founder of academy schools which were located in the southern states and provide free schools for former slaves.
(E) the first U.S. Secretary of Education.

11. The kindergarten was designed to
(A) teach children to read early.
(B) develop social skills and know the self.
(C) develop good relationship with parents.
(D) correlate the curriculum better.
(E) foster a love of learning.

12. While developing inductive reasoning, the teacher will first
(A) introduce the generalizations to be learned.
(B) state the objectives.
(C) present specific data from which a generalization is to be drawn.
(D) state a trial hypothesis.
(E) predict a tentative set of results.

13. A learning center is designed to include
(A) uninteresting materials.
(B) play things, only.
(C) difficult tasks designed to make students work and learn.
(D) busy work.
(E) various levels of reading and interest.
14. Within a career ladder plan, teachers seeking a promotion are evaluated by
   (A) colleagues.
   (B) students.
   (C) student achievement scores.
   (D) classroom observation.
   (E) amount of material covered in a certain time span.

15. Which classroom management skill would adaptations and accommodations for the left-and right-brain preference students be a function of?
   (A) Lesson plans  (D) (A) and (B)
   (B) Strategy      (E) All of the above.
   (C) Assertive discipline plan

16. Goals are written for a school by
   (A) the federal government board and Secretary of Health, Education and Welfare.
   (B) curriculum committees chosen by the local school system.
   (C) a combination of teachers and parents.
   (D) the State Commissioner of education and his staff.
   (E) individual disciplines' departments.

17. Formative questions are typically used
   (A) to determine the students' understanding and applications of the objectives.
   (B) periodically throughout the lesson sequence.
   (C) to give the teacher specific information and assessment.
   (D) All of the above.
   (E) Only (A) and (B).

18. In order for teachers to integrate technology into the classrooms, the principals should
   (A) observe what teachers already know.
   (B) include knowledge of technology on teacher evaluations.
   (C) check with state department on technology.
   (D) channel available funding into the purchasing of equipment.
   (E) plan staff seminars on using technology.
19. If a teacher is willing to increase wait time after asking a question he/she is likely to encounter
   (A) improved student response.
   (B) an increase in the number of appropriate responses.
   (C) an increase in the number of accurate responses.
   (D) more restlessness in his students.
   (E) Only (A), (B) and (C).

20. Educating the whole child is a concept emphasized by
   (A) concentrating on the core curriculum.
   (B) observing the psychological behaviors of the student.
   (C) growth and development of the entire child.
   (D) stressing your value system to the students.
   (E) the teaching of ethics.

21. Which of the following is the least effective method of determining the level of a student's reading ability?
   (A) Report cards from previous years
   (B) Teacher judgment
   (C) Consulting with last year's teachers
   (D) Using test results
   (E) Vocabulary drill

22. During a classroom discussion the teacher said, "Amy and Joe appear to be arguing that the Civil War started because of the fear of some southern state residents of economic domination by the North, while most of the class thinks slavery was the sole cause of the Civil War." The teacher is performing what important function in a class discussion?
   (A) Providing new information
   (B) Orienting the students to the objective of the lesson
   (C) Putting together a final consensus
   (D) Reviewing and putting together opinions into a meaningful relationship
   (E) Using prompting techniques

23. If you are required to teach a unit on a subject for which you have little background studies or knowledge and feel you do not have adequate resources available or ample time to prepare, perhaps the best introductory activity for you would be
   (A) to tell what you know and skip to another subject.
   (B) to assign independent projects to the students.
(C) a bulletin board display that a student or volunteer made.
(D) to substitute the subject with one you know.
(E) to have a resource person speak.

24. As a result of educational policy reports in the 1980s there have been changes in
(A) higher education, teacher preparation programs.
(B) teacher certification requirements.
(C) high school requirements.
(D) All of the above.
(E) Only (A) and (C).

25. Questions can be used to
(A) allow for creativity.
(B) check student comprehension.
(C) review the material previously covered.
(D) All of the above.
(E) Only (B) and (C).

26. Teachers who expect to have low-achieving students reach higher levels of cognitive understanding should use
(A) cooperative learning.  (D) indirect teaching.
(B) reasoning skills.  (E) lecture-format instruction.
(C) achievement scores.

27. The high school history teacher asked the American History class, "what was the effect of the Great Depression upon the attitude of Americans?" The teacher paused for about four or five seconds, then said, "John, would you please answer the question?" The procedure described above is an example of
(A) low level question.  (D) wait-time.
(B) anticipatory set.  (E) convergent questioning.
(C) prompting.

28. Jean Piaget's principles of learning are based on
(A) children's cognitive development.
(B) individualized instruction.
(C) children's physical development.
(D) children's moral instruction.
(E) children's self-conceptions.
29. The Madeline Hunter model includes a step designed to focus student attention upon the topic of the lesson. This step is known as
(A) modeling. (D) anticipatory set.
(B) input. (E) divergent questioning.
(C) withitness.

30. "On the worksheet are economic characteristics of ten countries we have not studied. Using what you know about capitalism and socialism, what countries do you believe have a socialistic system?" The teacher has asked a(n)
(A) knowledge question. (D) evaluation question.
(B) comprehension question. (E) redirected question.
(C) application question.

31. The primary reason for instructional planning is
(A) to have a plan for a substitute if you are out unexpectedly.
(B) because it is required by administrators.
(C) to focus your instructional methods, and skills, as well as the student's learning skills.
(D) to accomplish state requirements.
(E) to allow you to move from topic to topic with ease and without delay.

32. Rousseau believed that students could learn best if they experienced
(A) library resources such as books and periodicals.
(B) the teachers having a vital role.
(C) field trips with direct experiences.
(D) their parents' or caretakers' moral lessons.
(E) Both (A) and (D).

33. Teaching strategies are necessary to
(A) keep the long-term curriculum goals in sight.
(B) direct the administrator's attention to right emphasis.
(C) keep the teacher on task with the least amount of time.
(D) keep the students on task with no distractions.
(E) direct both the students and teacher toward accomplishing a goal.
34. Student instruction using individualized plans is not often used because
   (A) it takes too much time and money to implement.
   (B) achievement scores are not considered.
   (C) students do not like it.
   (D) sequence and structure in the subject are not considered.
   (E) All of the above.

35. A usable definition of an objective is
   (A) a statement of students' expectations.
   (B) a goal for the teacher and the students.
   (C) a statement of learner outcomes.
   (D) a statement of teaching methods.
   (E) an inventory of questions to be asked, materials to be used, and information to be covered.
Section 3

TIME: 30 Minutes
35 Questions

DIRECTIONS: Each of the following questions and incomplete statements is followed by five answer choices. Select the choice which best answers each question.

1. The time needed to learn is a consideration in mastery instruction. Another factor to consider is
   (A) teacher's attitude.  (D) student's attitude.
   (B) school environment.  (E) teacher's knowledge.
   (C) student's characteristics.

2. Assertive Discipline involves all of the following EXCEPT that
   (A) the students establish clear guidelines for their behavior.
   (B) the teacher creates and establishes clearly defined rules.
   (C) the teacher establishes clear consequences for violating the rules.
   (D) the teacher establishes a reward for appropriate behavior.
   (E) the teacher should be in charge of the classroom.

3. Classroom teachers are concerned that the special-needs students in their rooms achieve academic goals. Perhaps the greatest tendency is to
   (A) set goals lower for the special-needs students.
   (B) not give clear explanations that the students can understand.
   (C) provide too much guidance and assistance.
   (D) spend too much time preparing special materials for one student.
   (E) treat the student as an "average" one and hope he will feel comfortable enough to let learning take place.

4. Segregation that occurs as a result of school policies, laws, or government actions is
   (A) de jure segregation.  (D) semi-integration.
   (B) controlled choice.  (E) None of the above.
   (C) integration.
5. Recent research on the relationship of time and student learning defined engaged time. Which definition is correct?
   (A) Engaged time is that part of allocated time in which students are actively involved with academic subject matter.
   (B) Engaged time is the amount of time a student spends in independent study.
   (C) Engaged time is the amount of time allocated for each subject, for example, 4 minutes for math.
   (D) Engaged time is the allocated time in which students are involved with academic subject matter and have a high rate of success (80% or higher).
   (E) Engaged time is the average time the teacher spends on the core subjects in the curriculum.

6. Wait-time is important when planning a questioning strategy. Which of these is not true?
   (A) It discourages thoughtful risking
   (B) It facilitates comprehension
   (C) It allows assimilation of information so that rapid guessing does not occur
   (D) It gives the teacher time to formulate the next question
   (E) It allows students time to reword any new found information

7. After asking a question, the amount of time a teacher waits for a response should
   (A) depend on how uncomfortable and humiliated the student may appear to be.
   (B) bring a negative response from the student called on to answer.
   (C) serve to stimulate improved student responses.
   (D) not vary according to the student's intellectual ability.
   (E) depend on the time remaining in the lesson.

8. Integration and desegregation are different, since integration includes
   (A) voluntary student isolation according to race.
   (B) students are isolated in the school according to race.
   (C) students of different races go to the same school.
   (D) students attending the same school, but separation...
existing.
(E) development of positive interracial contact.

9. Which type of planning by teachers is the most important and effective planning?
   (A) Yearlong plans     (D) Weekly lesson plans
   (B) Daily lesson plans (E) Monthly lesson plans
   (C) Unit plans

10. Summative questions are typically used for which purpose?
    (A) For pre-introductory
    (B) For one-word answers
    (C) For closure and evaluation
    (D) To determine the progress toward goals and objectives
    (E) Attention-getting devices in the anticipatory set

11. When you use cognitive memory questions, it requires that students
    (A) form a hypothesis.     (D) recall informations.
    (B) solve a problem.       (E) criticize an idea.
    (C) compare and contrast information.

12. In the past few years, we have seen a movement of the Hispanic population into the inner-city in large urban areas, which has resulted in a form of
    (A) ability grouping or tracking.  (D) controlled choice.
    (B) magnet programs.           (E) integration.
    (C) segregation.

13. What is the proper sequence of the four major steps of class planning?
    (A) Evaluate the lesson, establish purpose, select the learning material, and organize the lesson
    (B) Establish teacher and student goals, choose appropriate materials, plan the lesson presentation and evaluate the lesson
    (C) Establish teacher goals, organize the lesson, select learning material and equipment, and evaluate the lesson
    (D) Establish goals, evaluate the lesson, organize the lesson and select materials
    (E) Organize lesson, establish goals, select materials, evaluate the lesson
14. Removing external stimuli is the reading teacher's attempt to increase
   (A) positive behavior.       (D) class discussion.
   (B) attention.               (E) test scores.
   (C) motivation.

15. Praise brings positive results in the classroom. While it is effective on the average, teachers praise students in class less than
   (A) 40% of the time.        (D) 20% of the time.
   (B) 10% of the time.        (E) 50% of the time.
   (C) 2% of the time.

16. The student will identify the various parts of a dictionary entry during class discussion. The objective listed above may have one or more deficiencies. Select the statement that is the best answer.
   (A) The behavior is not specified.
   (B) The condition is not specified.
   (C) The degree of mastery is not specified.
   (D) All requirements for an objective are met.
   (E) Neither the behavior nor the condition are specified.

17. When answering convergent questions, students must
   (A) make a prediction.
   (B) criticize a statement.
   (C) give "give" or "no" answers.
   (D) make a judgment.
   (E) solve some types of problems.

18. Bilingual education for single-language proficient students consists of instruction in
   (A) their native language and one other.
   (B) English.
   (C) two extra foreign languages.
   (D) only English and their native language.
   (E) None of these.

19. A Nation At Risk, written in 1982, called for school reform is several areas. Which of the following area/areas was listed as needed reform?
(A) That state and local officials assume a more active role in promoting educational excellence
(B) To raise the standards and difficulty levels of textbooks, grading systems and tests
(C) To allow more autonomy for teachers
(D) (A) and (B) only.
(E) (B) and (C) only.

20. Which of the following most influenced the desegregation of schools?
   (A) Governors
   (B) Department of Education Commissioners
   (C) The U.S. Supreme Court
   (D) U.S. Presidents
   (E) Pressure groups and lobbyists

21. Working one-to-one with a student at any age is a nearly perfect example of
   (A) instruction.
   (B) strategy.
   (C) motivation.
   (D) guided practice.
   (E) integration.

22. Self-discipline includes the ability and desire to
   (A) see that other peers behave appropriately.
   (B) see that one's own behavior is corrected when identified as inappropriate.
   (C) behave without any adult supervision.
   (D) All the above.
   (E) (A) and (B) only.

23. A teacher should meet the needs of ethnically diverse students matching teaching activities to
   (A) school curriculum guides,
   (B) children's experiences.
   (C) materials and resources available.
   (D) state instructional guides.
   (E) individual textbook guides.

24. What are the purposes for lesson planning?
   (A) School administrators require plans
   (B) Teachers can more effectively remember and implement
what they and the students need to do
(C) Teachers reduce their anxieties by thinking through what
they believe students should learn.
(D) All the above.
(E) (A) and (B) only.

25. Discovery lessons require the teacher to assume which of these
roles?
(A) Resource person, manager, receptor
(B) Facilitator, manager, sage
(C) Receptor, facilitator, sage
(D) Sage, resource person, manager
(E) Facilitator, resource person, manager

26. Individual Educational Plans were required under Public Law
94-142 for
(A) disadvantaged and handicapped children.
(B) handicapped children.
(C) school age handicapped children who require special
education or other special services.
(D) gifted and handicapped children.
(E) disadvantaged and gifted children.

27. Which is NOT a reason to rely upon nonverbal communication?
(A) Verbal messages are likely not to be genuine
(B) The forcefulness of nonverbal signals
(C) Feelings too offensive may be easier stated or displayed
nonverbally
(D) More than one means of communication may be needed to
give a complex message
(E) Even non-active students may become non-verbally
involved in class

28. Questioning strategy is part of
(A) teaching methodology. (D) instructional objective.
(B) teaching strategy. (E) All of the above.
(C) data processing.

29. Public Law 94-142 states that education for all disabled
children
(A) should be restricted learning environment.
(B) should be an equal educational opportunity.
(C) should be performed in the home.
(D) should be accomplished through the provision of self-contained classrooms.
(E) should be accomplished through the provision of at-home tutors.

30. Public school teachers are accountable for all of the following areas EXCEPT
(A) legal laws pertaining to schools.
(B) social development of the students.
(C) personality development of the students.
(D) academics for that subject or grade level.
(E) religious teaching.

31. Refusing to grant points due to misbehavior in a classroom where the teacher gives students points for positive behavior is a form of
(A) withholding reinforcement. (D) averting control.
(B) positive reinforcement. (E) None of these.
(C) reinforce-ignore strategy.

32. Evaluative questions require that students
(A) give yes or no answers. (D) make inferences.
(B) define the word. (E) judge and defend.
(C) recall facts.

33. Which of the following statements concerning teacher tenure are true?
I. Generally, tenured teachers can only be fired for specific reasons outlined in state law.
II. Without tenure, teachers might avoid teaching controversial topics.
III. Tenured teachers may not be replaced by lower paid beginning teachers to reduce a school district's payroll.
IV. Tenure protects the academic freedom of teachers.
(A) I, II and III are true. (D) I and III are true.
(B) I and II are true. (E) I, II, III and IV are true.
(C) I and IV are true.
34. Merit pay is an educational issue across the United States. Teacher groups generally oppose merit pay for all of the following reasons EXCEPT
(A) standardized tests of pupils are not a complete measure of teacher performance and should not be used as the basis for merit pay.
(B) ratings of teachers by principals may be biased.
(C) the percent of high ability students vary in each classroom.
(D) merit pay decisions may be politically influenced.
(E) years of service and education level can be determined without bias.

35. A "foundation program' for school finance refers to
(A) a specific amount of money per classroom provided to local school districts by the state government.
(B) a specific amount of money per student enrolled in each school provided to local school districts by the state government.
(C) the amount of the local tax rate multiplied by the assessed property values in a school district.
(D) state funding for local school districts which provides a minimal level of educational services regardless of the taxable value of property in a local district.
(E) a minimum tax rate established in a local school district.
B - 2. Translation of the Pedagogical Knowledge Test

교육학 문제 제1부

* 다음 문단에 가장 적합하다고 생각되는 것 하나를 골라 답안지에 표시하시오. (시간: 30분)

1. 신입 교사들이 경력교사들에 비해 잠재적인 영재아를 식별하는 데 어려움을 더 많이 겪는 이유는?
   1) 상충되는 연구 결과 때문
   2) 자기 자녀가 영재아라고 생각하는 부모의 압력 때문
   3) 신뢰도와 타당도가 결여된 검사결과 때문
   4) 교수경험이 적어서
   5) 학급분위기나 환경 때문

2. 과학 실험시간을 위한 가장 좋은 지도법은?
   1) 연역적 지도
   2) 개별적 사실이나 규칙을 지도
   3) 토론 첫 고르기
   4) 자동화될 때까지 연습시킴
   5) 정답 없음

3. 교사가 질문한 후 학생으로부터 더 자세한 대답을 듣으려면?
   1) 모든 질문 대답은 받아들이지 않는다.
   2) 질문을 더 전문적인 어휘를 사용하여 길게 한다.
   3) 질문을 다시 풀어서 원쪽두뇌가 좋은 학생에게 질문한다.
   4) 학생들의 대답을 쓰여 큰소리로 읽게 한다.
   5) 부가적인 정보를 대답할 수 있는 질문을 한다.

4. Bloom의 교육목표 분류의 6가지 수준 중 첫번째 수준인 지식을 평가하기 위한 문항의 종류는 주로 어떤 것인가?
   1) 총괄 평가 및 다타형 질문
   2) 기억을 측정하는 질문
   3) 확산적 질문
   4) 수렴적 질문
   5) 종합적 질문

5. 수업계획을 잘 세우고 훌륭한 수업을 해도 특히 저학년의 경우에 잘 이해하지 못하는 때는?
   1) 전체 수업지도안을 다시 점검하고 나중에 다시 가르친다.
   2) 수업 목표가 부적절하다.
   3) 아직 발달이 덜되어 이해하지 못하므로 포기한다.
   4) 학습자가 충분한 선수학습 지식이 없기 때문이다.
   5) 수업전략이나 지도법이 부적절했다.

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6. 교사가 공로상을 받을만한 경우는?
   1) 같은 학교에서 10년이상 근무했을 때
   2) 학생들의 학업성취가 높을 때
   3) 열성적이며 학급관리의 문제가 없을 때
   4) 연수교육에 많이 참여했을 때
   5) 훌륭한 수업을 지속적으로 했을 때

7. 어떠한 분야의 상관관계 연구가 교육에서 강조되어야 하나?
   1) 아동의 발달과 교육과정  2) 예산과 읽기 및 쓸기능력
   3) 사회생활과 경제적 수준  4) 경제적 수준과 읽기 및 쓸기능력
   5) 한 교사의 홍용방법과 다른 교사의 홍용방법

8. 교육목표 설정 시 고려하여야 할 사항은?
   1) 학습이 이루어지는 것을 알기위해 교사가 해야할 일
   2) 가르칠 수업지도한
   3) 수업 후 학생이 무엇을 할 수 있는가
   4) 교사와 학생이 하여야 할 일의 전술
   5) 정답 없음

9. 만약 교사의 공로를 월급에 반영한다면 이를 반대하는 사람들의 주장은?
   1) 평범한 교사들의 노력을 감소시킨다.
   2) 교사들의 협동과 의사소통에 장애가 된다.
   3) 나머지 교사의 봉급이 싸잡한다.
   4) 월급에 관계없이 동료에 대한 존경심이 감소된다.
   5) 학생들의 교사에 대한 존경심이 감소된다.

10. 만약 우리나라에 미국과 같이 많은 소수 민족이 있다면 가난한 소수 민족 학생들을 이해하고 동기를 부여하는데 교사가 어려움을 느낄 수도 있을 것이다. 그 이유는 무엇이라고 생각하나?
    1) 무관심한 부모
    2) 높은 결석률
    3) 언어와 문화의 차이
    4) 교육과정이 너무 어려워서
    5) 동료학생들의 압력

11. 교사의 직접적 강화 (Reinforcement)없이 학생의 반응을 야기할 수 있는 학습과정은?
    1) 조작적 소멸 (Extinction)
    2) 조작적 조건형성
    3) 조작적 조형 (Shaping)
    4) 모델화 또는 모방
    5) 정답 없음
12. 다음은 교육법 제5조의 일부이다. 이 조항에 담겨있는 근본성질을 그대로 반영하고 있는 주장은?
    "교육은 본래의 목적에 따라하여 운영실시되어야 하며 어떠한 정치적, 과당적, 기타 개인적 편견의 선점을 위한 방편으로 사용되어서는 안된다는.
    1) 국공립학교에서는 종교에 관련된 내용을 다루어서는 안된다.
    2) 교육과정을 개정할 때에는 다양한 사회집단의 의견을 수렴해야 한다.
    3) 교사가 학생에게 여러 정당의 정책을 소개해 줄 때 특정 정당의 입장만을 내변해서는 안된다.
    4) 자유민주주의의 체제를 유지하는 데 필요한 신념과 가치는 모든 학교에서 가르쳐도 무방하다.

13. John Dewey의 교육철학에서 본 교육의 목적은?
    1) 인간의 개인적 사회적 성장    2) 지적 발달
    3) 과학교육 강화                  4) 도덕교육 강화
    5) 인문과학 강화

14. 목표, 보충자료, 교수전략 및 활동 등을 다 이유 무엇의 일부분인가?
    1) 단기계획    2) 일일계획    3) 장기계획
    4) 단원계획    5) 교육과정

15. 시민이나 학부모로 구성된 학교자문위원회의 가장 적절한 기능은?
    1) 교사의 총용이나 숭전평가
    2) 학교 도서관의 도서에 관한 불만 처리
    3) 학교 운동부를 위한 기금 모집
    4) 교육정의 학교 예산 증액 요구
    5) 학교 교육과정점검 및 개선방안 제시

16. 수업계획 철학의 과학교사의 중요한 기능 (技能) 중의 하나이다. 과학 교사가 주도하는 수업 전 (前) 활동의 목적은?
    1) 학생의 과학을 위한 결과와 과정의 기능을 반영하기 위해
    2) 과학 목표를 진술하기 위한 정보를 제공하기 위해
    3) 학생으로 하여금 과학 공부를 하게 하기 위한 동기부여를 위해
    4) 1), 2), 3) 모두

17. 화상 수업 (Teleconferencing)의 필수 요건은?
    1) 직접저도    2) 서강검사 접수    3) 원거리 교육
    4) 전략적 수업    5) 집단 토론

18. John Goodlad의 연구결과에 의하면 수업시간 중 학생이 이야기하는 시간에 비용은 몇 % 미만인가?
    1) 50%    2) 6%    3) 20%    4) 2%    5) 10%
19. 교사의 수업을 분석비판하는 것은 수업계획수립 시에 어떻게 유익한가?
   1) 교사가 더 효율적인 수업계획을 세울 수 있다.
   2) 교사가 학생이 성취할 목표를 결정할 수 있다.
   3) 학생이 학습할 내용을 결정할 수 있다.
   4) 학생이 자신의 성취 목표를 결정할 수 있다.
   5) 학생이 교사의 지도방법을 결정할 수 있다.

20. 학생들이 직면하고 있는 압력에 교사는 어떻게 대처하나?
   1) 학교생활에 대한 높은 관심
   2) 특별과목에 대한 지식
   3) 새로운 목적이나 도전에 대한 준비
   4) 현실세계에 대한 지식
   5) 낮아진 자기 존중감

21. 학생들에게 처벌이 필요하다면 어떠한 방법이 좋은가?
    ㄱ. 어떠한 행동이 처벌받을 것인가를 미리 알려준다.
    ㄴ. 처벌받을 만한 행동 중 세번에 한번 꼴로 처벌한다.
    ㄷ. 부적절한 행동 직후 바로 처벌한다.
    ㄹ. 처벌의 결과로서 변화되어야 할 행동을 구체적으로 설명한다.
     1) ㄱ, ㄴ, ㄷ, ㄹ, ㄹ 2) ㄱ, ㄴ, ㄷ, ㄹ, ㄹ 3) ㄱ, ㄴ, ㄷ
     4) ㄱ, ㄷ, ㄹ 5) ㄴ, ㄷ, ㄹ

22. 우리나라 현행 교과서 제도에 대한 설명 중 바르지 않은 것은?
   1) 교사용 지도서는 교과용 도서에 포함되지 않는다.
   2) 고등학교에서의 공통필수 교과서는 모두 1종도서이다.
   3) 2종 도서용은 어느 교과서로 사용할 것인지 학교장 요청에 의해 미리
      관련 교육청이 정한다.
   4) 인정도서의 승인권은 교육감 또는 교육부 장관이 갖는다.

23. 학습을 즐기하게 하기 위해서 교사가 해야할 것은?
    1) 여러가지 다른 수업전략을 적절하게 활용한다.
    2) 직접지도법과 간접지도법을 성공적으로 활용한다.
    3) 학생들의 상호관계가 효율적인 학습에 도움이 되도록 한다.
    4) 1), 2), 3) 모두 5) 1), 2)

24. 스테이션(Station) 학습 시 교사의 강화가 가장 많이 필요한 학생은?
    1) 청각적인 학습을 잘하는 학생
    2) 학습 저진아
    3) 만성적인 수업애도 불량자
    4) 보통 학생 5) 조용한 영재 학생
25. 미국의 교육자들이 생각하는 일본식 교육은?
1) 일본교육이 미국교육의 모델이 되어야 한다.
2) 일본교육이 미국교육보다 우수하다.
3) 일본교육이 미국교육의 모델이 되어서는 안된다.
4) 일본교육은 학생들에게 충분한 압력을 주지 않는다.
5) 일본교육은 미국교육과 같은 수준이다.

26. 규준치항 (Norm-referenced)평가의 특징은?
1) 학생들을 일단의 표준에 따라 비교한다.
2) 미리 정해진 수준의 시험에 기능을 나타내야 한다.
3) 학생 상호간에 경쟁한다.
4) 어느 학생이 상위 20%에 속하는지 결정할 때 쓰인다.
   1) 2) 3) 4) 5) 6) 7) 8) 9) 10)

27. 국가 공무원법에 규정된 복무규정 가운데 공무원의무사항이 아닌것은?
1) 정열의 의무
2) 친절, 공정의 의무
3) 변상의 의무
4) 풍위 유지의 의무

28. 문제 학생의 두드러지는 특징은?
1) 높은 자아 존중
2) 낮은 성적
3) 좋은 가정환경
4) 모든 교과목에 대한 높은 관심
5) 적대 행위

29. 우리나라 초등학교 교원자격의 기본 과목으로 읽은 것은?
1) 정교사 2급 - 정교사 1급 - 교감 - 교장
2) 정교사 1급 - 정교사 2급 - 교감 - 교장
3) 정교사 2급 - 주임교사 - 교감 - 교장
4) 정교사 1급 - 주임교사 - 교감 - 교장

30. 동인집단 (Clique)의 특성에 해당하는 것은?
1) 강력한 지도자의 지시와 통제에 따라 행동한다.
2) 미성년자에게 금지된 행동을 하는 경우가 많다.
3) 동료 집단 중에서 가장 최초로 형성되는 집단이다.
4) 사회적 신분에 비슷한 사람으로 구성된 작고 친밀성 있는 집단이다.

31. Thorndike의 학습의 자극-반응 이론은 그의 효과의 법칙이라는 이론을 낳게 하는 데 도움이 되었다. 한 학생이 수학에서 A 학점을 받으면 이 좋은 학점을 받은 것은 다음 중 어떻게 작용하는가?
1) 자극
2) 학생이 공부를 했다는 표시
3) 학습이 일어났다는 표시
4) 효과
5) 1), 2), 3)
32. 비효율적인 교사가 주로 교육과정이나 교과서만 이용하는 이유는?
   1) 협동적인 교사라는 표식이므로
   2) 동기화, 열정, 수업에 대한 애정이 부족하므로
   3) 다른 것을 가르치면 잘못이라고 비난 받으므로
   4) 자기가 가르치는 학생의 나이에 적절한 자료라고 느끼므로
   5) 학생들에게 너무 많은 것을 가르친다고 비난 받으므로

33. 신임교사들이 처음 몇년 동안은 교과서 중심으로 가르치라고 권장받는 이유는?
   1) 수업에 자신감을 갖게 하므로
   2) 필수 교육과정을 가르치는 데 자신의 패턴을 형성할 수 있기 때문
   3) 학생들을 가르치는 동안 형성되는 교수기능들을 인지할 수 있으므로
   4) 1), 2), 3) 모두
   5) 정답 없음

34. 고등학교 수준에서 팀 티칭 (team teaching)의 이점은?
   1) 교사가 학생 개개인을 더 잘 이해할 수 있다.
   2) 학교의 수업경비를 절감할 수 있다.
   3) 교사의 특별한 능력과 장점을 활용할 수 있다.
   4) 교육계획 수립이 용이하다.
   5) 시험에서 언제나 높은 성취를 가졌다.

35. 1837년 유치원을 처음 설립한 사람은?
   1) Piaget
   2) Hutchins
   3) Herbart
   4) Froebel
   5) Montessori
교육학 문제 제2부

* 다음 문항에 가장 적합하다고 생각되는 것 하나를 골라 답안지에 표시하시오. (시간: 30분)

1. 성공적인 학생중심 교수법은?
   1) 팀 팀체
   2) 권위적인 학생 통제
   3) 교사의 지도감독이 거의 없는 소집단 활동
   4) 학생의 적응능력이 요구되지 않는 구조화된 활동
   5) 고등학생 기능 발달 촉진

2. 수업태도가 매우 좋지않은 학생의 성공적인 수업을 위해 필요한 조치는?
   1) 어떠한 조치도 필요없다.
   2) 더욱 풍부한 청찰과 강화가 필요
   3) 교의적으로 그 학생을 무시하고 다른 학생들만 지도한다.
   4) 다른 학생들에게만 주의를 집중 한다.
   5) 태도가 좋지 않은 학생을 멸리한다.

3. 교사 중심 수업에서 쓰이는 지도방법은?
   1) 발전 학습
   2) 측정없는 토론
   3) 간접지도법
   4) 소집단 활동
   5) 직접지도법

4. 영재교육 방법이 아닌 것은?
   1) 학급의 모든 학생이 성취할 수 있는 성도로 내용을 발전시킨다.
   2) 능력별 그룹지도
   3) 심화학습 경험 제공
   4) 가속적인 발달을 위한 특수한 프로그램 제공
   5) 학급 밖의 학습을 위한 기회 제공

5. 학생의 수업참여를 극대화하려면?
   1) 학교 행정자가 수업계획 수립
   2) 교사가 수업계획 수립
   3) 학생이 수업계획 수립
   4) 교사와 학생이 수업계획 및 실행방법 수립
   5) 교사와 행정자가 수업계획 및 실행방법 수립

6. 일일 수업지도안에 포함되어야 할 내용은?
   1) 수업내용의 이해 여부를 확인하기 위한 질문
   2) 예상되는 활동이나 수업 도입 단계
   3) 수업목표와 이의 성취를 위한 지도방법

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4) 1), 2), 3) 모두
5) 2) 와 3)

7. 선수학습을 통해 얻은 학생의 자실이 무엇인가를 아는 것은 중요하다. 특히 다음과의 수업 분석 단계 중 어느 단계의 분석을 위해 중요한가?
   1) 교사의 활동  2) 수업목표  3) 지도 과정
   4) 교사의 준비  5) 정리 및 평가 단계의 방법

8. 어린 아동의 발달단계에 적합한 교육과정에서 주로 강조하는 것은?
   ㄱ. 신체활동을 포함한 학습 경험
   ㄴ. 수렴적 사고 (Convergent thinking)를 강조하는 질문
   ㄷ. 조용하고 질서있으며 주의집중하는 학습
   ㄹ. 다양한 조작활동을 위한 수업자료
   1) ㄱ, ㄴ  2) ㄱ, ㄷ  3) ㄱ, ㄹ
   4) ㄱ, ㄷ  5) ㄴ, ㄷ, ㄹ

9. 우리나라의 현행 지방교육 재원 중 가장 규모가 큰 것은?
   1) 지방교육 양여금  2) 사용료 및 수수료
   3) 지방교육재정 교부금  4) 지방자치단체 일반회계 전입금

10. Horace Mann은 누구인가?
    1) 중등교육을 위한 사립학교 주창자
    2) 사립학교의 확장 주창자
    3) 초등교육의 목표교육화를 위한 보통학교 운동 설립자
    4) 미국 남부지역에 이전의 노예들을 위한 무료학교 설립자
    5) 초대 미국 교육부 장관

11. 유치원 설립의 원래 목적은 무엇이었나?
    1) 조기 읽기 교육  2) 사회성 발달과 자아 인식
    3) 부모와 좋은 관계 개발  4) 교육과정과 더 잘 관련짓기 위해
    5) 학습에 대한 예정을 기르기 위해

12. 귀납적 추리력을 기르기위해 교사가 첫째로 할 일은?
    1) 학습의 일반화에 대한 소개  2) 목표 진술
    3) 일반화를 도출할 수 있는 구체적 자료제시
    4) 실행가설 진술  5) 예견되는 결과 진술

13. 학습 센터 (Learning center)의 설립 의도는?
    1) 홍미없는 자료제시  2) 늘어장 제공
    3) 어린이 학습과정 제시  4) 바쁘게 활동할 과제 제시
    5) 다양한 수준의 읽기 과제와 홍미 제공
14. 교사의 승진을 위한 바람직한 평가 주체는?
   1) 동료교사  2) 학생  3) 학생의 성취 성적
   4) 교사의 수업관찰  5) 주어진 시간에 가르치는 양

15. 학교 중심 학생이나 우체 중심 학생의 적응과 수용을 위해 필요한 수업 관리 기술은?
   1) 수업지도안  2) 수업전략  3) 학생 훈육 계획
   4) 1), 2), 3) 모두

16. 학교 교육의 목적 (Goals)은 누가 설정하는가?
   1) 중앙 정부  2) 교육과정위원회  3) 교사와 학부모
   4) 시도 교육청  5) 각 교과 담당자

17. 형성 평가직 질문이 주로 쓰이는 경우는?
   1) 목표에 대한 학생의 이해와 적응여부를 알려주고 할 때
   2) 전체 수업의 계열을 통해 추적적으로
   3) 교사에게 특수한 정보와 평가를 제공하려 할 때
   4) 1), 2), 3) 모두
   5) 1)과 2)

18. 교사를 위해 새로운 기술 또는 기자제를 수업에 도입하려 할 때 교장이 할 일은?
   1) 교사가 이미 알고있는 내용을 파악
   2) 교사의 평가에 관한 항목 마련
   3) 그 기술에 관해 시도 교육청과 협의
   4) 기자제 구입 비용 마련 방법 강구
   5) 그 기술의 사용에 관한 스태프들의 세미나 준비

19. 교사의 질문 후에 학생의 가라리라는 시간 (wait time)을 증가시킬 때 나타날 수 있는 결과는?
   1) 개선된 학생의 대답
   2) 적절한 대답 수의 증가
   3) 정확한 대답 수의 증가
   4) 학생의 휴식시간 감소
   5) 1), 2), 3) 모두

20. 아동의 전인교육란?
   1) 종합 교육과정의 강조
   2) 학생의 심리적 행동 관찰
   3) 아동의 전체적인 성장 발달 강조
   4) 교사의 가치체계 강조

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21. 학생의 응기능력 수준을 결정하는 방법 중 가장 효율적이지 못한 것은?
   1) 전년도 성적표
   2) 교사의 판단
   3) 전년도 교사의 자문
   4) 읽기 검사 결과 활용
   5) 어휘 훈련

22. 토론 수업시 김교사가 "대부분의 다른 사람들이 미국의 남북전쟁이 단지
   노예제도 때문에 일어났다고 생각하는데 기질이와 은영이는 일부 남부
   지역 주민들이 북부 사람들에게 경제권을 빼앗길 것을 두려워한 나머지
   일으킨 전쟁이라고 주장하는 것 같다."라고 하였다. 김교사가 토론 수업
   시에 보여 준 중요한 기능은 무엇인가?
   1) 새로운 정보 제공
   2) 수업목표 중심으로 학생을 유도
   3) 최종 합의의 도출
   4) 의견들의 복습 및 의미있는 관계로의 통합
   5) 학생의 수업독려 기술 사용

23. 만약 교사가 잘못 알아서나 자료도 부족한 내용을 가르쳐야 한다면 또
   수업 준비할 시간도 부족하다면 어떻게 대처하는 것이 좋은가?
   1) 알고있는 것만 가르치고 다음 주제로 넘어간다.
   2) 학생에게 독립적인 숙제를 내 준다.
   3) 학생이나 자원봉사자가 만든 게시물을 활용한다.
   4) 교사가 알고있는 다른 내용으로 대치한다.
   5) 그 내용에 대해 잘 알고 있는 사람을 초빙한다.

24. 우리나라는 현행 지방교육자치제에 대한 것 중 옳은 것은?
   1) 교육감은 교육위원회에서 무기명투표로 선출한다.
   2) 부교육감은 교육감이 임명한다.
   3) 교육위원회의 의장은 당해 시도 의회에서 선출한다.
   4) 교육위원은 당해 시도 주민들이 직선한다.

25. 질문이 쓰이는 경우는?
   1) 창의력을 신장시키려 할 때
   2) 학생의 이해여부를 확인하려 할 때
   3) 이전의 학습내용을 복습하려 할 때
   4) 1), 2), 3) 모두
   5) 2) 와 3)
26. 학업성취도가 낮은 학생들에게 높은 지적 이해 수준에 이르도록 기대하게 하려면 어떠한 방법이 좋은가?
   1) 동료학생들과의 협력학습
   2) 주리력 신장
   3) 성취도
   4) 간접지도법
   5) 강의식 수업

27. 교사가 어떤 질문을 한 후 4-5초 기다린 후 "성구가 대답해 봐라?"라고 했다면 이것은 무엇의 예인가?
   1) 낮은 수준의 질문
   2) 학생의 주의집중 유도
   3) 독려
   4) 대기 시간 (Wait time)
   5) 수렴적 질문

28. Jean Piaget의 학습원리의 기초는?
   1) 학생의 인지적 발달
   2) 개별화 학습
   3) 학생의 신체적 발달
   4) 도덕 교육
   5) 학생의 자아 개념 형성

29. Madeline Hunter의 모델은 수업의 주안점에 학생의 주의집중을 위한 단계가 포함되어 있다. 이 단계를 무엇이라고 하는가?
   1) 모델링
   2) 새로운 정보 제공
   3) 학생의 문제행동 식별
   4) 주의 집중 유도
   5) 확산적 질문법

30. "우리가 배운 자본주의와 사회주의의 경제적 특성에 관한 지식을 통하여 다음 10개국 중 사회주의 국가는 어느 것인가 고르시오"라는 질문은 어떠한 종류의 질문인가?
   1) 단순지식 질문
   2) 중합적 질문
   3) 응용적 질문
   4) 평가적 질문
   5) 재지시적 질문
31. 수업계획의 주된 목적은?
   1) 교사의 결근 시 대치교사의 수업을 위해
   2) 학교 행정가가 요구하니까
   3) 학생의 학습기능, 교사의 지도방법, 지도 기능에 초점을 두기 위해
   4) 교육청의 요구이므로
   5) 수업내용의 한 주제에서 다른 주제로 원활하게 넘어가기 위해

32. Rousseau가 주장하는 학생의 학습을 위한 가장 좋은 경험은?
   1) 책, 정기간행물 같은 도서관의 자료를 통한 경험
   2) 교사의 적극적인 역할
   3) 직접적인 현장 경험
   4) 부모나 보호자의 도덕 교육
   5) 1)과 4)

33. 교수 전략이 필요한 이유는?
   1) 장기적인 교육과정 목표를 향상 염두에 두기 위해
   2) 교강의 의도를 판철시키기 위해
   3) 교사가 최소의 시간을 투입해 과제에 충실하게 하기 위해
   4) 학생이 진실을 막 농지 않고 과제에 충실하게 하기 위해
   5) 교사와 학생이 교육 목표를 달성하게 하기 위해

34. 학생 개개인을 위한 개별화 학습계획이 자주 사용되지 않는 이유는?
   1) 시간과 경비가 너무 많이 소요되므로
   2) 성취도검수가 고려되지 않기 때문
   3) 학생들이 좋아하지 않으므로
   4) 수업내용의 계열화와 구조화가 고려되지 않으므로
   5) 1), 2), 3), 4) 모두 포함

35. 수업목표의 조작적 정의는?
   1) 학생들의 기대를 진술한 것
   2) 교사와 학생의 목적
   3) 학습자 성취결과의 진술
   4) 지도방법의 진술
   5) 질문할 문항, 수업 자료, 수업내용의 목록
교육학 문제 제3부

* 다음 문음에 가장 적합하다고 생각되는 것 하나를 골라 답안지에 표시하시오. (시간: 30분)

1. 완전학습에서는 학습에 소요되는 시간이 중요한 요인으로 간주되고 있다. 완전학습을 위한 또 다른 중요한 요인은 무엇인가?
   1) 교사의 태도
   2) 학교환경
   3) 학생의 특성
   4) 학생의 태도
   5) 교사의 지식

2. 단정적 훈육 (Assertive discipline)에 관한 것이 아닌 것은?
   1) 학생이 자신의 행동에 관한 명확한 지침을 설정한다.
   2) 교사가 명확하게 정의된 규칙을 세운다.
   3) 규칙을 어겼을 경우의 결과에 관해 교사가 지침을 정한다.
   4) 적절한 행동에 관한 포상 지침을 교사가 정한다.
   5) 교사가 학급을 책임진다.

3. 특별학습지도가 필요한 학생의 성취목표 수준에 대해 교사가 가장 많이 열려하는 것은?
   1) 성취목표가 너무 낮다는 점
   2) 학생이 이해할 수 있도록 명확한 설명을 하지 않는다는 점
   3) 너무 많은 지침과 도움을 준다는 점
   4) 학생을 위해 특별학습자료를 준비하는 데 너무 많은 시간을 소비한다는 점
   5) 그 학생을 평균수준의 학생으로 간주하며 혼자 학습하게 두는 것이 그 학생이 편안하게 생각할 것이라고 바라는 점

4. 학교가 가정, 타기관과 다른 특징은?
   1) 상호적, 방임적
   2) 일차적, 보호적
   3) 계획적, 합리적
   4) 감시적, 훈육적

5. 시간과 학습과의 관계에 관한 최근의 연구에서 참여시간 (Engaged time) 이란?
   1) 학생이 수업내용에 능동적으로 참여하는 수업할당시간의 일부분
   2) 학생의 독자적인 학습에 사용되는 시간
   3) 각 교과에 할당된 시간
   4) 학생이 높은 성공율 (80% 이상)로 수업내용에 참여하는 수업할당시간의 일부분
   5) 교육과정의 중핵적인 교과에 교사가 소비하는 평균시간

6. 교사의 질문 후에 학생의 대답을 기다리는 대기 시간 (Wait-time)에 관한 설명 중 틀린 것은?
   1) 학생들이 갑자이 생각하는 것을 막을 위험이 있다.
   2) 학생의 이해를 용이하게 한다.

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3) 집작으로 빠르게 대답하는 것을 예방한다.
4) 교사에 다음 질문을 할 시간을 준다.
5) 새로운 정보에 관해 학생이 다시 생각할 시간을 준다.

7. 교사의 질문 후 학생의 대답을 기다리는 시간은 어때야 하나?
   1) 학생이 불편해 하는 모습을 보일 때까지 기다린다.
   2) 호명받은 학생의 부정적인 답변을 야기하도록 한다.
   3) 개선된 학생의 대답을 유도하도록 한다.
   4) 학생들의 지적 능력을 고려하지 않고 기다리는 시간을 같게 한다.
   5) 난은 수업시간에 따라 결정한다.

8. 행정제도에 있어서 지방분권제도의 장점은?
   1) 지방의 특수성에 맞는 교육정책이 가능하다.
   2) 교육기회의 불균형을 조절한다.
   3) 행정의 능률화를 기할 수 있다.
   4) 신속하고 강력하게 교육정책을 할 수 있다

9. 가장 중요하고 효율적인 수업계획은?
   1) 연간계획
   2) 일일계획
   3) 단원계획
   4) 주간계획
   5) 월간계획

10. 총괄평가의 목적이란?
    1) 수업의 도입을 위해
    2) 단답형의 대담을 위해
    3) 수업의 정리 및 평가를 위해
    4) 수업목적 및 목표를 설정하기 위해
    5) 학생의 주의집중을 위해

11. 인지적 기여에 관한 문항은 학생의 어떠한 능력을 검사하는 것인가?
    1) 가설설정 능력
    2) 문제해결력
    3) 정보의 비교 능력
    4) 정보의 회상 능력
    5) 비판적 사고력

12. 사회교육기관에 대한 설명 중 옳은 것은?
    1) 고등공립학교와 고등기술학교는 고등학교 과정이다.
    2) 산업계 근로자를 위한 야간특별학급은 학력인정기관이 아니다.
    3) 한국 방송통신대학은 3년제 전문대학과정이다.
    4) 개방대학은 전문대 졸업자격이나 학사학위를 수여할 수 있다.

13. 수업계획의 내지 단계가 올바로 나열된 것은?
    1) 수업평가, 목표설정, 학습자료 선정, 수업조직
    2) 교사와 학생의 목표설정, 학습자료 선정, 수업조직, 수업평가
    3) 교사의 목표설정, 수업조직, 학습자료 선정, 수업평가
    4) 목표설정, 수업평가, 수업조직, 학습자료 선정
    5) 수업조직, 목표설정, 학습자료 선정, 수업평가

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14. 업기시간에 교사가 외부의 수업방해요소를 제거하는 목적은?
   1) 학생의 공정적 행동을 증가시키기 위해
   2) 학생의 주의를 집중시키기 위해
   3) 학생을 동기유발시키기 위해
   4) 활발한 학급의 토론을 위해
   5) 시험성적의 향상을 위해

15. 적당한 정도의 청찬은 수업에 공정적인 결과를 가져온다. 보통의 교사들이 실제로 학급에서 하는 청찬의 비율은 수업시간의 몇% 미만인가?
   1) 40%  2) 10%  3) 2%  4) 20%  5) 50%

16. “학생이 학급토론 시간에 학교 운동부의 문제점을 지적할 수 있다.” 위의 수업목표 진술에서 부족한 것은?
   1) 구체적인 행동이 진술되지 않았다.
   2) 구체적인 조건이 진술되지 않았다.
   3) 학습의 정도가 진술되지 않았다.
   4) 모든 요건이 다 충족되었다.
   5) 구체적인 행동도 조건도 진술되지 않았다.

17. 수렵적 질문에 대해 학생들이 대답할 때 해야 될 것은?
   1) 예측  2) 비판  3) 예, 아니오의 대답
   4) 판단  5) 어떠한 형태의 문제 해결

18. 이중 언어 교육 시 가르쳐야 할 언어는?
   1) 학생의 모국어와 다른 외국어  2) 국어
   3) 두개의 다른 외국어  4) 국어와 학생의 모국어
   5) 정답 없음

19. 1982년에 발간된 “미국의 교육위기” 에서 개혁이 필요하다고 주장하는 분야는?
   1) 교육의 수원성을 촉진하기 위한 정부의 농동적인 역할
   2) 교과서와 평가체계의 수준과 난이도 향상
   3) 교사의 자율성 보장
   4) 1)과 2)
   5) 2)과 3)

20. 학교중심 진로교육 모형에 있어, 중학교 단계에서 중점을 두는 것은?
   1) 진로준비  2) 진로인식
   3) 진로정치  4) 진로탐색

21. 학생과 교사가 일대 일로 수업하는 것은 다음 중 무엇이 좋은 예인가?
   1) 수업  2) 전략  3) 동기유발
   4) 유도학습  5) 통합

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22. 자기 훈육 (Self-discipline)에 포함되는 능력이나 희망은?
   1) 동료의 적절한 행동과약하는 능력이나 욕구
   2) 잘못된 자기의 행동을 고치는 능력이나 욕구
   3) 어른의 감독없이 행동하는 능력이나 욕구
   4) 1), 2), 3) 모두
   5) 1) 과 2)

23. 문화적 특성이 다양한 학생 집단의 지도를 위해 교사가 강조하여야 할 수업활동은 무엇과 관련된 것이라 하나?
   1) 학교 수준의 교육과정
   2) 학생의 경험
   3) 학습자료
   4) 국가 수준의 교육과정
   5) 교과서의 지침

24. 수업지도안 작성의 목적은 무엇인가?
   1) 학교 행정의 요구 때문
   2) 교사가 학생과 교사가 해야 할 일을 효율적으로 기역 및 실행할 수 있기 때문
   3) 학생이 학습해야 할 내용을 미리 생각해 봐서 교사들의 불안을 감소시킬 수 있기 때문
   4) 1), 2), 3) 모두
   5) 1) 과 2)

25. 발견학습에서 요구하는 교사의 역할은?
   1) 자료제공자, 수업관리자, 수용자
   2) 학습촉진자, 수업관리자, 경험자
   3) 수용자, 학습촉진자, 경험자
   4) 경험자, 자료제공자, 수업관리자
   5) 학습촉진자, 자료제공자, 수업관리자

26. 개별화 학습 지도안 (Individual Educational Plan)은 어떠한 종류의 특수 아동을 위한 것인가?
   1) 결핍 아동과 장애 아동
   2) 장애 아동
   3) 특수 교육이 필요한 학령의 장애 아동
   4) 영재아와 장애 아동
   5) 결핍 아동과 영재아

27. 비언어적 의사전달에 의존하는 이유가 되지 않는 경우는?
   1) 언어적 의사전달이 정확하지 않을 때
   2) 비언어적 신호가 효과가 있을 때
   3) 비언어적으로 전달하는 것이 쉽다고 느낄 때
   4) 복잡한 메세지의 전달을 위해 여러가지 의사전달 방법이 요구될 때
   5) 수업에 능동적이지 못한 학생이 수업에 비언어적으로 참여하게 될 때

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28. 질문 전략은 다음 중 무엇의 일부분인가?
   1) 지도방법론  2) 지도전략  3) 자료처리과정  
   4) 수업목표  5) 1), 2), 3), 4) 모두

29. 미국의 교육법 94-142조에 의하면 모든 장애 아동은
   1) 제한된 교육환경이 제공되어야 한다.  
   2) 동등한 교육 기회를 가져야 한다.  
   3) 가정에서 공부해야 한다.  
   4) 장애아동을 위한 별도학급에서 공부해야 한다.  
   5) 집에서 가정교사를 두고 공부해야 한다.

30. 공립학교 교사의 책임이 아닌 것은?
   1) 학교에 관련된 법률  2) 학생의 사회성 발달  
   3) 학생의 성격 발달  4) 학년에 따른 학업성취  
   5) 종교교육

31. 행동이 좋은 학생에게 부가점수를 주는 학급에서 행동이 좋지 못한 학
   생에게 부가점수를 주지 않는 것은 다음 중 무엇의 예인가?
   1) 강화의 억제  2) 긍정적 강화  3) 강화 - 무시 전략  
   4) 통제 회피  5) 정답 없음

32. 평가적 질문이 학생들에게 요구하는 것은?
   1) 예, 아니오의 대답  2) 단어의 정의  3) 사실의 회상  
   4) 추론  5) 판단과 방어

33. 복식학급의 특성에 해당하는 것이 아닌 것은?
   1) 2인 이상의 교사가 한 학급을 지도하는 것이다.  
   2) 학생수가 적거나 시설이 부족한 경우 전용한다.  
   3) 인적학년제 복식학급과 원격학년제 복식학급 형태로 나눌 수 있다.  
   4) 연령, 학년, 능력 및 생활경험이 다른 둘 이상의 집단이 한 학급이 된다.

34. 교원의 정체사상의 사유에 해당하지 않는 것은?
   1) 교육공무원법 및 이 법에 의한 명령을 위반한 자  
   2) 직무상의 의무에 위배하거나 직무에 태만한 자  
   3) 직무 내외를 불문하고 그 체면 또는 위신을 손상한 자  
   4) 시발서 3회 이상 쓴 자

35. 지방 교육재정 규모결정의 주요 재원이 아닌 것은?
   1) 교육세  2) 지방교육 교부세  3) 지방교육 영여금  4) 지방교육 재정교부금

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Appendix C

Volleyball Course Grades
<table>
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<tr>
<th>Subject</th>
<th>Required Course I</th>
<th>Required Course II</th>
<th>Elective Course III</th>
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<th>Mean</th>
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Appendix D

ALT-PE Micro Computer Data Collection System
**ALT-PE MICRO COMPUTER DATA COLLECTION SYSTEM**

<table>
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<tr>
<th>CONTENT GENERAL</th>
<th>CONTENT PHYSICAL EDUCATION</th>
<th>ENGAGEMENT</th>
<th>DIFFICULTY</th>
</tr>
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<tbody>
<tr>
<td>Transition (T)</td>
<td>Practice (P)</td>
<td>NOT ENGAGED</td>
<td>Appropriate (A)</td>
</tr>
<tr>
<td>Management (M)</td>
<td>Scrimmage (S)</td>
<td>Waiting (W)</td>
<td>Inappropriate (N)</td>
</tr>
<tr>
<td>Rest (R)</td>
<td>Game (G)</td>
<td>Off Task (O)</td>
<td>(X) after Cont. Gen.</td>
</tr>
<tr>
<td></td>
<td>Knowledge (K)</td>
<td>Cognitive (C)</td>
<td>(X) after all but</td>
</tr>
<tr>
<td></td>
<td>Non-focused (N)</td>
<td>Indirect (I)</td>
<td>Motor Engagement</td>
</tr>
</tbody>
</table>

**TIME**

- **BEGIN**
- **END**
- **ELAPSED**
- **INTERVALS**
- **ALLOCATED**

**STUDENT**
Appendix E

Qualitative Measures of Teaching Performance Scale
## Qualitative Measures of Teaching Performance Scale

**Name of Teacher**

**Name of Coder**

**Focus of Lesson**

**Lesson Number**

<table>
<thead>
<tr>
<th>Task</th>
<th>Presentation of Task</th>
<th>Clarity</th>
<th>Demo.</th>
<th>Amount of Cues.</th>
<th>Accuracy of Cues.</th>
<th>Qualitative Cues</th>
<th>Length of Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>Type of Task</td>
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<td><strong>Totals</strong></td>
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<td><strong>% for each Category</strong></td>
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<td><strong>% most desirable</strong></td>
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<td><strong>Total QMTPS</strong></td>
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</tbody>
</table>

**Type of Task**
- **I-Informing**
- **R-Refining**
- **E-Extending**
- **Re-Repeal**
- **A-Applying**

**Clarity**
- 1-Yes
- 2-No

**Demonstration**
- 1-Yes
- 2-Partial
- 3-No

**Amount of Cues**
- 1-Appropriate
- 2-Inappropriate
- 3-None Given

**Accuracy of Cues**
- 1-Accurate
- 2-Inaccurate
- 3-None Given

**Qualitative Cues Provided**
- 1-Yes
- 2-No

**Length of Presentation**
- 1-Appropriate
- 2-Too Long
- 3-Too Short
Appendix F

Interrelation Matrix for Linear Relationships among Content Knowledge, Pedagogical Knowledge and Teaching Performance
### Intercorrelation Matrix for Linear Relationships Among Content Knowledge, Pedagogical Knowledge, and Teaching Performance

<table>
<thead>
<tr>
<th></th>
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<th>14</th>
<th>15</th>
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<th>17</th>
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<tbody>
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<td>1. AGE</td>
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<td>0.21</td>
<td>0.34</td>
<td>-0.01</td>
<td>-0.52*</td>
<td>0.25</td>
<td>0.27</td>
<td>-0.09</td>
<td>-0.26</td>
<td>0.44</td>
<td>0.16</td>
<td>-0.05</td>
<td>-0.02</td>
<td>0.77**</td>
<td>0.30</td>
<td>0.21</td>
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<tr>
<td>2. GENDER</td>
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<td>0.10</td>
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<td>0.27</td>
<td>0.66**</td>
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<td>-0.08</td>
<td>0.70**</td>
<td>-0.15</td>
<td>0.54*</td>
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<tr>
<td>3. CK</td>
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<td>0.21</td>
<td>0.01</td>
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<td>4. PK</td>
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<td>0.57*</td>
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<td>0.41</td>
<td>0.64**</td>
<td>-0.34</td>
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<td>5. GRADE</td>
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<td>6. MANAGEMENT</td>
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