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**A MODEL HEALTH-RELATED  
ELEMENTARY PHYSICAL EDUCATION PROGRAM  
FOR SAIPAN:  
TEACHERS' KNOWLEDGE, ATTITUDES, AND  
PRACTICES**

by

**Kurt C. Barnes**

**A dissertation submitted in partial fulfillment of the requirements  
for the degree of Doctor of Education**

**University of San Diego**

**2002**

**Edward F. De Roche, Ph. D., Chair  
Fred J. Galloway, Ed. D., Member  
Cheryl A. Getz, Ed. D., Member**

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**This dissertation is dedicated to the CNMI health, wellness, and physical education teachers/instructors who together can stimulate a healthier lifestyle within the CNMI community.**

**It is also dedicated to my two wonderful children, and their families, Kimberly and Kevin. Without their enduring support, this dissertation would not be possible.**

**And lastly, it is dedicated to my inspirational wife who challenges me from beginning to end to be the best that I can be.**

**May health and wellness be a part of everyone's life.**

## **ACKNOWLEDGEMENTS**

Now, in retrospect, I more fully understand why it takes a committee of scholars to develop, nurture, challenge, and counsel a candidate, over time, to the successful completion of his/her doctoral studies. This task and its accompanying achievement are shared with and would not have been possible without the help of the following individuals.

I express sincere gratitude to Dr. Edward DeRoche for his direction and mentoring on the theoretical basis of the study and his leadership role as the committee chairperson. To Dr. Fred Galloway, who challenged me from beginning to end, my appreciation for this will return again and again. To Dr. Cheryl Getz, who graciously shared her expertise in subject matter, which greatly facilitated the project, please accept my heart felt thanks.

To my loving and caring wife, Sol, for her undying support and understanding when I was "always working on my dissertation". Thank you for caring for me to succeed to this highest level in academia.

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To all the elementary classroom teachers on Saipan, a special thank you, for without your filling out the questionnaire, this study would not be been possible or successful. A special thank you to the teachers at Kagman Elementary School: Yes, folk dance does belong in the physical education curriculum and yes, children are suppose to have fun in physical education classes.

And to all the other individuals in my life, directly and indirectly associated with this study, thank you. You will all be remembered forever.

Thank you

## **ABSTRACT OF THE DISSERTATION**

The purpose of this study was to determine if there was significant differences in changes of knowledge, attitudes, and practices between elementary school teachers who took part in an in-service physical education training program and those who did not take part. The in-service training program utilized a model health-related physical education program. The setting for the study was a school district on Saipan whose teachers were required to teach physical education. Teachers in five of nine public elementary schools were placed in the in-service training program. A questionnaire assessing knowledge, attitudes, and practices, was administrated as a pre- and post-test. A second post-test, utilizing only the practice section, was administrated eight weeks after the first post-test.

This quantitative study utilized a treatment and control group. The treatment group took part in an eight-week in-service training program using a model health-related physical education program to provide the in-service training. The control group did not receive the in-service training. This researcher visited each of the five treatment group schools once a week for eight weeks.

Multiple regression analysis was used to determine the change in scores for knowledge, attitudes, practices, and total score between the independent variables, number of sessions attended for the in-service training, gender, grade level taught, number of years of teaching experience, and number of personal exercise days per week among participating teachers. The best fitting regression model was employed to estimate what relationships existed between the change of scores for the four dependent variables and the independent variables.

Results showed a statistically significant, positive relationship between the number of in-service training sessions attended and change in knowledge score. The more sessions attended produced a higher knowledge score. Results also showed a weak but statistically significant relationship between grade levels taught and change in attitudes toward the teaching of physical education. However, the remaining independent variables of gender, number of years taught, and number of personal exercise days per week showed no treatment effect on any of the change of scores.

In conclusion, it is evident that elementary teachers who attended an in-service training program improved their knowledge in teaching physical education. However, elementary teachers' attitudes and practices toward the teaching of physical education did not improve. This implies the need for physical education pre-service and on-going in-service training programs for all elementary school teachers on Saipan.

# TABLE OF CONTENTS

| <b><u>CHAPTER</u></b>   | <b><u>PAGE</u></b> |
|---|--------------------|
| <b>CHAPTER ONE - INTRODUCTION TO THE STUDY</b>                                      | <b>1</b>           |
| Introduction  | 1                  |
| Background of the Study   | 3                  |
| Physical Education - The Islands  | 3                  |
| Purpose of the Study  | 7                  |
| Statement of the Problem  | 7                  |
| Research Questions  | 9                  |
| Significance of the Study   | 9                  |
| Definition of Key Terms   | 12                 |
| <br>  |                    |
| <b>CHAPTER TWO - REVIEW OF LITERATURE</b>   | <b>15</b>          |
| Introduction  | 15                 |
| Importance of Physical Education  | 15                 |
| Lifestyles Impact Fitness Levels  | 19                 |
| The New Physical Education  | 25                 |
| Promote Learning and Develop Attitudes  | 30                 |
| Building Physical Education Programs to Meet<br>Student Needs                       | 36                 |
| Role of Elementary Classroom Teachers<br>in Teaching Physical Education             | 45                 |
| Related Studies on Teacher Training for Effective<br>Physical Education Instruction | 48                 |
| Summary   | 55                 |
| <br>  |                    |
| <b>CHAPTER THREE - RESEARCH AND METHODOLOGY</b>                                     | <b>59</b>          |
| Introduction  | 59                 |
| Model Physical Education Program  | 61                 |
| In-service Training   | 62                 |
| Research Design and Methodology   | 63                 |
| Timeline  | 64                 |
| Choosing the Sample   | 65                 |
| Instrumentation - Questionnaire   | 66                 |
| Pre-test Procedures   | 67                 |
| Post-test Procedures  | 68                 |
| Data Collection & Statistical Analysis  | 68                 |
| Validity and Reliability  | 70                 |

|   |            |
|---|------------|
| Analysis of Data . . . . .  | 72         |
| Limitations of the Study . . . . .  | 72         |
| Ethical Considerations . . . . .  | 73         |
| Summary . . . . .   | 74         |
| <br>  |            |
| <b>CHAPTER FOUR – RESULTS and ANALYSIS . . . . .</b>  | <b>75</b>  |
| Introduction . . . . .  | 75         |
| Design of the Study . . . . .   | 76         |
| Demographic Comparison . . . . .  | 79         |
| Calculating Values for the Variables . . . . .  | 81         |
| Questionnaire Response Analysis . . . . .   | 82         |
| Attitudes . . . . .   | 82         |
| Practices . . . . .   | 83         |
| Knowledge . . . . .   | 87         |
| Multiple Regression Analysis . . . . .  | 87         |
| Initial Model . . . . .   | 87         |
| Final Model . . . . .   | 96         |
| Review of Research Hypotheses . . . . .   | 104        |
| Summary . . . . .   | 108        |
| <br>  |            |
| <b>CHAPTER FIVE – INTRODUCTION, FINDINGS, CONCLUSIONS<br/>and RECOMMENDATIONS . . . . .</b> | <b>110</b> |
| Introduction . . . . .  | 110        |
| Methodology . . . . .   | 111        |
| Literature Review . . . . .   | 111        |
| Data Collection . . . . .   | 112        |
| Research Design . . . . .   | 114        |
| Questionnaire . . . . .   | 115        |
| Limitations . . . . .   | 116        |
| Model Physical Education Program . . . . .  | 117        |
| In-Service Training . . . . .   | 118        |
| Analysis of Data . . . . .  | 121        |
| Interpretations of Findings . . . . .   | 120        |
| Recommendations for Further Study . . . . .   | 126        |
| Study Conclusions . . . . .   | 129        |
| <br>  |            |
| <b>REFERENCES . . . . .</b>   | <b>134</b> |
| <br>  |            |
| <b>APPENDIX A - Questionnaire . . . . .</b>   | <b>148</b> |
| <b>APPENDIX B - Model Physical Education Program . . . . .</b>                              | <b>161</b> |
| <b>APPENDIX C - Letter of Request to Commissioner of Education . . . . .</b>                | <b>211</b> |
| <b>APPENDIX D - Consent Form . . . . .</b>  | <b>213</b> |
| <b>APPENDIX E - Results of Attitude Section of Questionnaire . . . . .</b>                  | <b>215</b> |
| <b>APPENDIX F – Results of Practice Section of Questionnaire . . . . .</b>                  | <b>220</b> |
| <b>APPENDIX G – Results of Knowledge Section of Questionnaire . . . . .</b>                 | <b>229</b> |

## LIST OF TABLES

|          |   |    |
|----------|---|----|
| Table 1  | Number of Sessions for Each School . . . . .  | 63 |
| Table 2  | Timeline for pre-test, treatment, 1 <sup>st</sup> post-test<br>and 2 <sup>nd</sup> post-test . . . . .  | 65 |
| Table 3  | In-service Training Schedule . . . . .  | 66 |
| Table 4  | Descriptive of the Demographic Variables . . . . .  | 80 |
| Table 5  | Averages of Attitude Scores . . . . .   | 83 |
| Table 6  | Averages of Practice-01 Scores (Pre-test in relationship<br>to Post-test-01) . . . . .  | 84 |
| Table 7  | Averages of Practice-02 Scores (Post-test-01 in relationship<br>to Post-test-02) . . . . .  | 85 |
| Table 8  | Averages of Practice-03 Scores (Pre-test relationship<br>to Post-test-02) . . . . .   | 85 |
| Table 9  | T-test for Practice-01 and Practice-03 Score . . . . .  | 86 |
| Table 10 | Averages of Knowledge Scores . . . . .  | 87 |
| Table 11 | Initial Model Multiple Regression Summary Table for R,<br>Adjusted R <sup>2</sup> , R <sup>2</sup> and Standard Error of the Estimate   | 89 |
| Table 12 | Initial Multiple Regression Summary Table for Estimate<br>Coefficient, Standard Error, t-statistic, and Level<br>of Significance for the Dependent Variable:<br>Change in Knowledge Score . . . . . | 91 |
| Table 13 | Initial Multiple Regression Summary Table for Estimate<br>Coefficient, Standard Error, t-statistic, and Level<br>of Significance for the Dependent Variable:<br>Change in Attitude Score . . . . .  | 93 |
| Table 14 | Initial Multiple Regression Summary Table for Estimate<br>Coefficient, Standard Error, t-statistic, and Level<br>of Significance for the Dependent Variable:<br>Change in Practice Score . . . . .  | 94 |
| Table 15 | Initial Multiple Regression Summary Table for Estimate<br>Coefficient, Standard Error, t-statistic, and Level<br>of Significance for the Dependent Variable:<br>Change in Total Score . . . . .     | 96 |
| Table 16 | Final Model Multiple Regression Summary Table<br>for R, Adjusted R <sup>2</sup> , R <sup>2</sup> , Standard Error of the<br>Estimate and Significant Level . . . . .                                | 98 |

|          |   |     |
|----------|---|-----|
| Table 17 | <b>Final Model Multiple Regression Summary Table<br/>for Estimate Coefficient, Standard Error, t-statistic,<br/>and Level of Significance for the Dependent Variable:<br/>Change in Knowledge Score</b> | 99  |
| Table 18 | <b>Final Model Multiple Regression Summary Table<br/>for Estimate Coefficient, Standard Error,<br/>t-statistic, and Level of Significance for the<br/>Dependent Variable: Change in Attitude Score</b>  | 101 |
| Table 19 | <b>Final Model Multiple Regression Summary Table<br/>for Estimate Coefficient, Standard Error,<br/>t-statistic, and Level of Significance for the<br/>Dependent Variable: Change in Practice Score</b>  | 102 |
| Table 20 | <b>Final Model Multiple Regression Summary Table<br/>for Estimate Coefficient, Standard Error,<br/>t-statistic, and Level of Significance for the<br/>Dependent Variable: Change in Total Score</b>     | 104 |
| Table 21 | <b>ANOVA: Restricted Model. Dependent variable:<br/>Change in Knowledge</b>   | 105 |
| Table 22 | <b>ANOVA: Restricted Model. Dependent variable:<br/>Change in Attitudes</b>   | 106 |
| Table 23 | <b>ANOVA: Restricted Model. Dependent variable:<br/>Change in Practices</b>   | 106 |
| Table 24 | <b>ANOVA: Restricted Model. Dependent variable:<br/>Change in Total Score</b>   | 107 |
| Table 25 | <b>Model Summaries Used to Test Hypothesis 5</b>  | 108 |
| Table 26 | <b>In-Service Physical Education Training Schedule</b>  | 121 |

# **CHAPTER ONE**

## **Introduction to the Study**

### **Introduction**

Physical education programs are designed to provide students with an opportunity to develop the “whole person” in the physical, cognitive, and affective domains (Pangrazi, 1998). Instruction and participation in physical activity is the first step to health and wellness. It is not the aim of physical education programs to develop elite athletes, but rather for children to develop attitudes that encourage the adoption of a physically active life-style.

In the past, physical education programs were regarded as an integral part of the over-all education curriculum in the United States. Many states required mandatory physical education classes, and in most states, a specified number of minutes per week were part of the framework of the over-all physical education philosophy (Arbeit, Johnson, Mott, Harsha, Nicklas, Webber, Berenson, 1992; Luepker, Perry, & McKinlay, 1996; McKenzie, Sallis, Faucette, Roby, & Kolody, 1997; Siedentop, 1998; Mitchell & Earls, 1987). However, as of 2001, only one state, Illinois, mandates daily K-12 physical education classes (Boyles, 2001).

Behavioral research in different areas has revealed that knowledge of a specific subject is related to attitudes toward that subject (Brynteson, Hoag & Schollmeier, 1980). Researchers state that positive attitudes toward physical activity can be influenced by an enhanced knowledge of health-related fitness concepts, and vice-versa (Fishbein and Azjen, 1975; Fultz, 1977; and Laurie, Slava & Corbin, 1982). Assuming this statement is

valid, then the fundamental responsibilities of physical educators or teachers of physical education should be to promote an understanding of the concepts of health-related physical education and to stimulate behavioral changes toward improvement of one's own level of physical activity and fitness. Of course, both common sense and scientific evidence suggest that mere knowledge of the concepts underlying health-related fitness may not be sufficient to get children "fit for life." The concepts must be applied through practical experiences if they are expected to be of value for the individual.

Developing a better quality physical education program in the United States has been a goal of the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) and other professional organizations for many years (AAHPERD, 1994). The Healthy 2000 objectives included two goals related to the conduct of physical education by the year 2000 (United States Public Health Service, 1991). The first goal was to increase to at least 40 percent the proportion of children in first through twelfth grade who participated in daily physical education. The second goal was to increase to at least 50 percent the proportion of school physical education class time that students spent being physically active, preferably by engaging in lifetime physical activities. In addition, there was further agreement on the changes that needed to be made with physical education programs and that is, that physical education needs to be taught more frequently (AAHPERD, 1994; AAHPERD, 1998). However, there is a need for qualified instructors to teach physical education (Sallis & Patrick, 1994). If this is not feasible, a quality in-service program needs to be provided. To reach the goals of Healthy 2000, students need to spend more class minutes engaged in moderate to vigorous physical activity (McKenzie,

Feldman, Woods, et al., 1995; United States Public Health Service, 1991); students need to be engaged in more lifetime fitness activities (Corbin & Pangrazi, 1994); and programs should promote lifetime physical activity (Pate & Hohn, 1994a, 1994b; Lambert, 2000).

The purposes and implications of physical education programs are quite clear. The approach to providing meaningful and dynamic physical education programs is less clear. Pate and Hohn (1994b) succinctly characterize the situation as, “goal clear, strategy uncertain” (p. 216).

### **Background of the Study**

The motivation for this study came from the writer’s interest in physical education programs on Saipan in the Commonwealth of the Northern Mariana Islands. In part, this interest stems from the fact that all elementary classroom teachers became responsible for teaching their own physical education in 1998. Most classroom teachers did not have sufficient knowledge or expertise to implement a physical education program for their students. Communication with the Public School System (PSS) administrators revealed their interest in learning the level of knowledge, attitudes, and practices of the elementary classroom teacher in regards to teaching physical education. This researcher requested, and was granted, an opportunity to provide an in-service training program, using a model physical education program and at the same time to collect data by using a pre-test and post-test.

### **Physical Education - The Islands**

Improving the quantity and quality of physical education programs is a major concern for the Commonwealth of the Northern Mariana Islands (CNMI) Public School

System. Few elementary and secondary schools on Saipan provide adequate physical education programs and, in some cases, none are provided at all. At the elementary school level, classroom teachers are now responsible for the teaching of physical education. The elimination of trained physical education teachers came about in 1998 as the CNMI government faced a major financial crisis. Physical education teachers who elected to stay on in the CNMI Public School System were placed in self-contained classrooms as teachers.

Recent studies indicate that a great number of American and CNMI children are not physically fit. The CNMI Nutrition Council reports that at least 33% of students are overweight or obese (1997 CNMI Statistical Yearbook, 1998). For American children, the American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD, 1998) reported that almost 40% of children age five through eight have health conditions that increase their risk of early heart disease. The American Heart Association (AHA) in 1998 and the Surgeon General's Report in 1996 found that half of the youth between the ages 12 to 21 were not active on a regular basis. The Center for Disease Control and Prevention (CDC) reported that the number of overweight children between the ages of six and seventeen doubled in the last few years and, of those children, 11%, or 4.7 million, were seriously overweight (1996). Smith and Cestaro (1992) indicated if children were taught at an early age the importance of physical activity and the future benefits received due to being physically active, conditions such as heart disease and obesity could be avoided in adulthood.

The positive outcomes and advantages out-weigh the reasons for not including a meaningful physical education program. People who exercise regularly live longer and have a better quality of life; build a stronger and more efficient cardiovascular system; decrease “bad” cholesterol levels and increase “good” cholesterol levels (Durant, Linder & Mahoney, 1983); attenuate body fat and lose weight (Sarís, Binkhorst, Cramwinckel, Van Waesberghe, & Van Der Veenhezemans, 1987); look and feel better; lower blood pressure (Panico, Celentanto, Krogh, et al. 1987); improve self-esteem (Goodwin, 1999); create and maintain better posture; help reduce the possibility of osteoporosis, diabetes, and other chronic diseases associated with physical inactivity; build life-long fitness and aerobic skills and attitude (Ross & Gilbert, 1985; Cale & Harris, 1993; Sleep & Warburton, 1992); and achieve better grades in school than their non-active counter-parts (Miller, 2000).

As an educational leader and a teacher of physical education for some twenty-five years in the CNMI and Micronesia, the researcher has seen a dramatic increase in kinetic diseases related to the lack of physical activity and proper nutrition. The researcher believes this increase can be blamed on the modernization of the Micronesian islands and the resultant dependence on modern conveniences such as automobiles, televisions, motorboats, and canned foods. There is less practice of traditional physical activities, such as fishing, farming, walking, climbing coconut trees, swimming, paddling, canoeing, and sailing. Research establishing the negative influence of television on a quality life-style of children in Canada (Demers, 1993) and the United States (Dietz and Gortmaker, 1985; Robinson, 1999) may also be true for the children on Saipan. A quality physical education

program could replace the void left by the abandonment of traditional skills, and might provide each child with the necessary skills to be more physically active in life.

Obesity, diabetes, heart disease, and cancer are just some of the problems caused by lack of exercise and physical activity. The leading cause of early death in the CNMI is heart disease, followed closely by cancer and diabetes (1997 CNMI Statistical Yearbook, 1998). The diabetes rate in the CNMI is increasing exponentially. The CNMI National Food and Nutrition Advisory Council (Policy and Ten Year Plan Of Action, 1996) states that 1700 females, or 23% of the total indigenous adult female population on Saipan, each has a recorded weight of over 180 pounds. Many of these women stand barely five feet in height. There are 22 kidney dialysis machines now in full use at the Public Health Clinic on Saipan. Ironically, in 1995, there were only 2 such machines (Eugenio, 2000, March 6). According to Chailang Palacios, a public health official, (personal communication, February 13, 1999) doubling the available dialysis machines today would still not be enough to service all the individuals who need renal support. The rates of a myriad of other health-related diseases are soaring out of control due in large part to the lack of exercise and poor nutrition. Consequently, the average life span for a person born in the CNMI is only 60 years of age.

In a 1996 CNMI school-based survey, it was found that 39% of all five through eleven-year-old children on Saipan were either overweight or obese. Forty-one percent of the boys and thirty-seven percent of the girls were in these categories. In 1994, the CNMI's Division of Public Health looked at 200 randomly selected three to four year old children for a vitamin A study. These children's tendency toward obesity (>95% weight

for height percentile) was 11.5% compared to the expected 5% level for the US mainland (Policy and Ten Year Plan Of Action, 1996).

### **Purpose of the Study**

The purpose of this study was to determine if there is a significant change in elementary classroom teachers' knowledge, attitudes, and practices when exposed to a model health-related physical education program. An additional aim of this study was to determine if there were significant differences between elementary classroom teachers' attitudes, knowledge, and practices after being exposed to a model health-related physical education program by specific grade levels taught, gender, length of teaching experience and number of exercise days per week.

The results of this study could be used to show that elementary physical education programs may be improved by pre-service or in-service training programs that provide knowledge and techniques for teaching effective physical education classes and also foster the implementation of a new philosophy of physical education (Lambert, 2000). Lambert suggests that education should be put back into physical education. On Saipan, nearly 200 elementary teachers could improve their knowledge of teaching physical education and 5,000 students could be reached through organized, quality daily physical education programs in public schools. With this additional knowledge, an attitudinal change and better classroom practice habits may also be achieved.

### **Statement of the Problem**

Students have been falling short of the expected health and physical education requirement in the CNMI (Policy and Ten Year Plan Of Action, 1996). Awareness of the

mental and physical ingredients of fitness and wellness are not being promoted to the students in the CNMI as well as it might be. The health and fitness of CNMI youth have become a concern to many in government, health, research, business, and education. Michaud and Andres (1990) expressed their concern, in part, as a result of the association between chronic diseases and inactivity among adults as well as from allegations that American youth are both inactive and unfit. The CNMI Food and Nutrition Council (Policy and Ten Year Plan Of Action, 1996) have also substantiated the fact that CNMI youth are not active enough to meet minimal physical fitness standards. The acquisition and practice of health-related fitness habits may prevent children from being victims of the same or similar chronic diseases that are currently affecting their parents.

Despite the importance of physical education and the role that it can play in promoting the optimal growth of each individual, the subject has not been given enough attention in the CNMI schools. It is this researcher's belief that physical education programs are often considered a waste of time or merely fun and games. Physical education instruction generally has a low priority when compared with other subject areas, such as computer and bilingual programs, and is often deemed less important than English, mathematics, and the sciences. Little time is allocated to physical education instruction in the school year. For example, in high school, a student need only take one year (two semesters) of physical education to graduate. During the ongoing CNMI recession, elementary classroom teachers are teaching physical education. Unlike before, no physical education specialist is employed at the Public School System central office. When the position was filled in the past, this individual only planned and coordinated after-school

sports. The regular physical education curriculum has been widely ignored. Lastly, there is a lack of proper indoor and outdoor facilities, insufficient proprietary budget and other financial support, and a shortage of basic supplies and necessary equipment.

The combination of the 1987 resolution and the report by NASPE caused this researcher to center his study on Saipan elementary teachers.

### **Research Questions**

Based on the purpose of the study, two research questions were posed:

1. Does exposure to a model health-related physical education program influence or affect a change in attitudes, knowledge, and practices of Saipan elementary school teachers?
2. Do demographic variables, such as gender, grade level taught, number of years teaching, and number of days an individual exercises per week, help explain any changes in attitudes, knowledge, and practices in elementary classroom teachers exposed to a model health-related physical education program teaching physical education on Saipan?

### **Significance of the Study**

This study has significance for a number of reasons. Those associated with teaching elementary physical education desire to know the level of their attitudes, practices, and knowledge of physical education. These factors can have a positive or negative impact on a physical education program, its teaching, the priority given to it, and the benefits to children. The study is important to the elementary school principals on Saipan because it may help them to understand the level of their classroom teachers'

preparation for teaching physical education so that future pre-service and in-service courses can build on teachers' existing attitudes, practices, and knowledge. The study also has significance for those who design physical education curricula. The study can demonstrate the value of building a physical education philosophy based on a model health-related physical education program. In a review of health-related physical education programs, the need for activity as an essential element of children's life-styles is widely recognized (Pangrazi, 1998). Physical education programs that teach life-style changes in physical activity can lead to improved health for youngsters (Simons-Morton, Parcel, O'Hara, Blair, & Pate, 1988; Sallis & McKenzie, 1991). Pangrazi (1998) is of the opinion that health-related physical education has a unique place in the over-all school curriculum. Should the unique outcomes of a health-related program not be achieved in physical education classes, they conceivably cannot be achieved anywhere else in the curriculum.

The study also has significance for school administrators in demonstrating the value in-service physical education training programs may bring to a school district. The use of in-service programs can demonstrate the value of providing training to elementary classroom teachers in order to upgrade their knowledge, attitudes, and teaching practices, to acquire new concepts and methods in the teaching of physical education, and to provide a vehicle in which classroom teachers can present a basic physical education curriculum to their students. Barnett & Merriman (1994) advocate for schools to facilitate a change in physical education programs in order to develop and prepare teachers who teach physical education to be aligned with the new paradigm of health-related physical education.

Furthermore, this study is significant because it may add to the research in health-related physical education. Teachers' attitudes toward teaching elementary physical education have been examined in only one small study (Jones, 1999). The knowledge and practices of elementary teachers toward teaching elementary physical education have never been studied. The need exists to build a research base of studies that examine teachers' attitudes, practices, and knowledge in regards to teaching physical education. It is hoped this study will be a useful contribution and beginning.

This study is also important to parents and educators in general because they have a stake in the health and well being of children. Their stake in the health of children could help us focus on viable physical education programs, that are in place to teach the value of being healthy throughout one's lifetime. A recent survey asked parents of elementary aged children in the United States, "What should be taught to students prior to their graduation?" Participants indicated that information about health was more important for students to learn than content in language arts, mathematics, science, history, or any other subject (Marzano & Kendall, 1998). Teaching physical education in the elementary school, therefore, is important, and a physical education program is at the heart of this study.

It is hoped that this study will underscore the need for regular, ongoing, in-service training and adoption by the Public School System of a district-wide model physical education program. It is also hoped that this research will contribute to the currently small body of literature on teachers' knowledge, attitudes, and practices regarding physical education.

### **Definition of Key Terms**

Cardiovascular fitness is the ability of the heart, blood vessels, blood, and respiratory system to supply fuel, oxygen, and nutrients to the muscles. The term cardiovascular fitness can be used simultaneously with the term cardiorespiratory fitness (Hoeger & Hoeger, 1997).

Health-related fitness prepares students to live physically active, healthy lives by presenting carefully planned opportunities in a progression of learning experiences. These experiences must be planned to encourage the developmentally appropriate acquisition of motor skills, health-related fitness knowledge, confidence in being physically active for a life-time, an awareness of the requirements for sustaining optimal health, and an appreciation and understanding of the benefits of physical activity.

Maximal oxygen consumption ( $VO_{2max}$ ): is the highest rate of oxygen consumption an individual is capable of during maximum physical effort, reflecting the body's ability to transport and use oxygen (Fahey, Insel & Roth, 2001).

Moderate physical activity is defined as activities that use large muscle groups and are at least equivalent to a brisk walk. In addition to walking, these activities may include recreational swimming, bicycling, social dancing, low-impact aerobic dancing, gardening and yard work, and various domestic and occupational activities (Kent, 1994).

Obsolescence is the process of physical education knowledge and practices becoming obsolete and outdated by not being updated in an appropriate manner with current and contemporary information.

Physical education is the term used to denote the area of study within the school system that relates to the physical growth and physical activity of the body. This area of

study should promote cardiovascular efficiency, muscular strength and endurance, flexibility, and an awareness of body composition (Pangrazi, 1998).

Physical fitness is the ability to perform daily tasks vigorously and alertly, with energy left over for enjoying leisure time activities and meeting emergency demands. It is the ability to endure, to bear up, and to withstand mental and physical stress. Physical fitness also allows an individual to carry on in circumstances where an unfit person could not continue. One's level of physical fitness is a major basis for good health and well being (President's Council on Physical Fitness and Sports, 1985).

Practices are the methods, procedures, and techniques that a teacher incorporates in order to teach physical education classes (Pangrazi, 1998).

Sedentary describes a person who is relatively inactive and whom has a life-style characterized by a lot of sitting (Kent, 1994).

Skills-related fitness includes those physical qualities that enable a person to perform in sport-related activities which some researchers (Pangrazi, 2001) believe is partially due to genetic makeup, such as the proportion of slow to fast twitch muscles. The components that make up skills-related fitness are agility, balance, coordination, power, and speed (Pangrazi).

Vigorous physical activity is defined as the rhythmic, repetitive physical activities that use large muscle groups at 70 percent or more of the maximum heart rate appropriate for the age group. An exercise heart rate of 70 percent of maximum heart rate for age is about 60 percent of maximal cardiorespiratory capacity and is sufficient for cardiorespiratory conditioning. The maximum heart rate equals roughly 220 beats per

minute minus age. Examples of vigorous physical activities include jogging/running, lap swimming, bicycling, high-impact aerobic dancing, skating, rowing, jumping rope, cross-country skiing, hiking/backpacking, racquet sports, and competitive group sports (for example, soccer and basketball) (Kent, 1994).

Wellness is a characteristic of a life-style that includes positive attitudes and actions toward daily living. Thus, wellness is the state of the person that encompasses the total being of the person (Hoeger & Hoeger, 1997).

## **CHAPTER TWO**

### **Review of Literature**

#### **Introduction**

Four related areas will be examined in this review of the literature and will be organized into the following sections. The first section relates to the importance of physical education. The second section deals with the new paradigm that is establishing a different content in the teaching of physical education and recent, relevant studies regarding physical education. Section three is comprised of the latest research on the role of the classroom teacher in teaching physical education. The fourth section surveys the related studies in attitudes and opinions from teachers about physical education. A summary of the reviewed material that has been reported will conclude this chapter.

#### **Importance of Physical Education**

As long ago as 1951, Van Hagen, Dexter, and Williams (1951) wrote:

*“Educators have long recognized the need for a thorough program of physical education during the early years of childhood. These are the years of rapid growth and development when strength and stamina are acquired to form a healthy body. These are the years when posture habits are being formed and fundamental motor skills are being learned to give the individual poise, grace, and bodily efficiency. Physical education, with its many kinds of activities offered to develop the whole child, has an important place in the program of the ... school. (p. 57)”*

Morrison (1969) states that the aim of physical educators is to provide worthwhile physical activities that encourage children to develop skillful movements and behaviors in a variety of situations. Rhythm and movement tasks that are challenging, diverse, fun, and rewarding will promote positive lifelong attitudes toward personal fitness, physical

education, and leisure pursuits. Three virtues of life are for all children to become physically active, literate, and educated.

It is imperative that physical exercise habits be established as early as possible in a child's life (Aarts, Paulussen and Schalma, 1997). Studies have shown that participation in physical activities decreases as children become teenagers. Kemper (1995) studied Dutch adolescents and found that there was a significant decline in physical activity at the age of fourteen. Kelder, Perry, & Klepp (1993) observed similar patterns in American youth. These results suggest that children's daily physical activity habits are short lived and may consequently cease to transfer into adulthood. Therefore, just like other regular health behaviors (e.g. dental care, personal hygiene, seat-belt use, low-fat eating, contraceptive use), it is important to advocate and establish exercise habits early in life so they may persist into adult years. Efforts have been undertaken to design educational or other intervention programs aimed at motivating adolescents to develop life-long patterns of physical activity (Sallis, Alcaraz, McKenzie, Hovell, Kolody, & Nader 1992; Aarts et al. 1997).

In a study by Glass (1973), conducted in the public schools of Iowa, more than 5,000 children between the ages of 6 and 18 were examined over a two-year period. Of these children, 70% had symptoms of coronary heart disease, 7% had extremely high cholesterol levels, a large percentage had high blood pressure, and at least 12% were obese. Twenty-five years later, Pangrazi (1998) states that the percentage of obese children in the United States approaches 35% or almost three times the percentage than just 25 years previously.

The life-styles of CNMI children, just like the life-styles of American children (Rose, 1973), need to be changed before they reach their eighth birthday. Before this time, dietary and exercise patterns are relatively easy to change, but change becomes increasingly difficult to effect as the child grows older. In examining the developmental history of arteriosclerosis in humans, Rose notes that “the first signs appear around age 2 and the disease process is reversible until the age of 19” (p.80). Since Rose’s study was done twenty-nine years ago, other research now indicates that heart disease is indeed reversible through regular physical activity (Brooks, 2000; American College of Sports Medicine, 1998).

According to Dr. Jon Kimball, a noted cardiologist at the University of Colorado, the evidence is growing stronger that the bodily changes leading to heart disease begin early in life (Albinson and Andrews, 1976). He also points out that more and more autopsy reports on young children show blood vessels that have begun to clog with fatty deposits, which can eventually lead to a heart attack.

Wilmore and McNamara (1974) examined 95 boys, age eight to twelve years, in an effort to determine the extent to which coronary heart disease risk factors derived from an adult population were manifested in a group of young boys. They concluded, “coronary heart disease, once considered to be a geriatric problem, is now recognized as being largely of pediatric origin” (p. 72).

Kirchner (1974) emphasized that past and present United States presidents, members of the medical profession, and countless leaders in business and education have stressed the need for a physically fit nation from childhood through adulthood. Physical

education, as a subject in the elementary school curriculum, thus must not be considered merely as a means of “training the body”. It must be thought of as an integral part of the total curriculum with unique goals and contributions.

Many experts believe that physical activity undertaken in childhood has a lifetime impact (Blair, 1993; Corbin & Pangrazi, 1992; Rowland, 1985; Rowland, 1990; Armstrong & Bray, 1991; Morrow & Freedson, 1995; AAHPERD, 1998; Welk, 1994). Saltin and Grimby (1968) conducted a research project to learn whether the benefits of childhood activity carried over to adult life. They compared the ability to adjust to effort in three groups of subjects age 50 to 59. One group was former athletes who had not participated in any activity for over 20 years and who worked in sedentary jobs. A second group consisted of former athletes who kept up a regular training and exercise program during their adult years. The third group was individuals who were not athletes in youth and who were inactive as adults. Results showed that the non-athlete group was capable of the least effort (measured by maximal oxygen consumption). The group that was active during youth, but took part in little activity during adulthood scored significantly higher than the non-athlete group. The athlete group that had maintained training scored a great deal higher than the other two groups. The significance of the study is that it shows that functional active ability as an adult appears to be partly a result of physical activity initiated during the developing years.

All children have the right to a lifetime of physical activity and health. When schools fail to teach children how to live an active life-style, they may not become active and healthy adults. A 1985 study conducted by the United States Department of Health

and Human Services showed that about half of all United States children were not acquiring the satisfactory exercise knowledge and skills needed to develop a healthy cardiovascular system (Ross & Gilbert, 1985). The same study showed that only about one-third of United States youth participated in organized physical education programs. Other studies also indicate that a quarter of all U. S. students get no physical education at all (Slobogin, 2002).

Most evidence suggests that if children become obese, unfit, and inactive in childhood, they will remain so throughout their adolescence and adulthood (Dishman, 1989). There is a clear understanding that habits of participation and fitness develop in childhood.

#### Life-styles Impact Fitness Levels

A combination of factors appears to be responsible for the decline of adolescents' physical fitness levels (Blair, 1993). Davis and Issacs (1985) acknowledge these factors to be a changing life-style dominated by the automobile, fast foods, television, and computer and video game use. Two other factors are the importance placed on gifted athletes and the unwillingness of federal and state governments to pledge support for physical education curriculum, facilities and equipment (Davis and Issacs; Lambert, 2000).

Overweight children are not necessarily overeaters. Unfortunately, much of the food they enjoy contains high amounts of calories. A child does not have to eat large amounts of food to put on excess weight. An extra 200 calories a day (the amount in four homemade chocolate chip cookies) can cause a child to gain almost one-half pound a week if the child is inactive (Childhood Obesity, 1997).

Inactivity is one of the primary causes of weight gain (Blair, 1993). Weight control involves balancing food intake with the energy burned in everyday activities. Although diet and heredity are factors, low levels of physical activity may play a greater role in childhood obesity than eating lots of high-calorie food. Johnson, Burke and Maher, (1956) studied ninth grade girls and found that girls who were obese ate less but also exercised two-thirds less (in total time) than normal-weight girls. The same researchers in a study of children in an elementary school in Massachusetts discovered that children gained more weight during the winter when they were less active. Movies taken of normal-weight and overweight children demonstrated a great difference in activity levels of the two groups, although diets were quite similar (Corbin and Fletcher, 1968).

Why are children today less active? Many blame increased television viewing. Watching TV only requires a minimum of energy and often is accompanied by snacking on high-calorie foods. The AHA reports that, on average, children watch 17 hours of television a week. And that's not counting the time spent playing video and computer games. One study found the odds of being overweight were nearly five times greater for youth watching more than five hours of television per day compared with those who watched from zero to two hours per day (Robinson, 1999). The same researcher studied the children in two elementary schools in San Jose, California and found a preponderance of evidence showing that children who reduce the hours of watching television, and playing video and computer games, also reduced their body weight.

Dietz and Gortmaker (1985) and Robinson (1999) also studied the correlation between obesity levels and number of hours of watching television. They concluded that

the amount of TV children viewed was directly associated with measures of their body fat. They also concluded the prevalence of obesity in the sample increased 2% for each additional hour of TV viewed per day. As for the correlation between physical fitness and TV viewing, Armstrong, Sallis, Alcaraz, Kolody, McKenzie, and Hovell (1998) establish that children who watch more TV tend to perform more poorly in a mile run than those children who watch less TV. Electronic entertainment lures children into a sedentary lifestyle. Two-thirds of the children in public schools today will go weeks without ever working up a sweat (Kelly, 1996). Inactivity has also become habitual and a way of life for children in the CNMI (Eugenio, 2000).

The popular belief that children get plenty of regular, vigorous physical activity as a normal part of their everyday routine is no more than a myth for millions of youngsters (Gallahue, 1993). Gallahue (1993) reviewed the results of the 1985 National Children's and Youth Fitness Study. The study revealed that over one-third of the children tested were insufficiently active in their daily lives to derive aerobic benefits. The Amateur Athletic Union's (AAU) Physical Fitness Test Data, according to Gallahue, reported that children are fatter and heavier than their counterparts of twenty or even just ten years ago. Gallahue reported that the Shape of the Nation Survey (1987) revealed that 40 percent of children ages five through eight already exhibit at least one coronary risk factor, including obesity, elevated blood pressure, high cholesterol, or low levels of physical activity. Furthermore, research has proven that one-third of school-aged boys and one-half of school-aged girls are not able to run one mile in less than ten minutes (Gallahue, 1993).

The fitness levels of both children and adults have steadily declined since 1968. Today's adolescents are in poorer health than their parents were at the same age. The findings of the 1985 National Children and Youth Fitness Study (Ross & Gilbert, 1985) indicated that one-third of American youth were not physically active enough for aerobic benefits. The findings of the 1987 study (Ross & Pate, 1987) and another ten year study (Updyke, 1994) show that children weighed more and had more percent body fat than their counterparts did twenty years earlier. It is clear that for many individuals, the level of physical activity for leading an active life is far below what it should be.

Understanding there is an enormous interdependence between regular physical activity and enhanced health, more than four out of ten adults still indicate that they are not likely to increase physical activity in the imminent future. This is true even though the President's Council on Physical Fitness and Sports (Corbin & Pangrazi, 1994) has demonstrated what can be done to improve fitness when adults, as well as children, are exposed to a quality physical education program that is carefully designed to address individual weaknesses.

The implications of a society becoming overweight rapidly will have a profound and burdensome influence on the medical system. Thompson (1998) indicates that the last thing that our society needs today is increased sitting. They have mastered this skill by sitting in front of TV's, computers, and video games. Reports (e.g., Pangrazi, 1998) suggest that the number of overweight American children has doubled in the past decade, due in large part to our automated society and sedentary life-styles. Elementary school teachers lament that at least half of their students appear to be overweight (Thompson

1998). The question has to be asked: Who is going to pay for all of this excess weight, lack of fitness, and increased illness as these overweight children grow to be overweight adults? Recent estimates indicate that overweight people are 44 percent more likely than the fit to financially strain their employers, the health care system, insurance costs, and taxpayers (Williams, 1998).

Darden (1998) in his book, A Flat Stomach ASAP, is of the opinion that the United States has escalated to being the number one country in the world with the fattest people. Twenty years ago, the US was third, behind Russia and Germany. CNMI statistics are similar to those of the United States (1997 CNMI Statistical Yearbook, 1998), though as an undeveloped country, CNMI is not included in the rankings. Darden (1998) says that over 75 percent of Americans over the age of twenty-five are considered overweight and or obese. CNMI statistics (1997 CNMI Statistical Yearbook, 1998) shows a frightening similarity, if not higher, to US figures on overweight people.

Physical inactivity is related to more than just coronary heart disease and other chronic illnesses. Mandigo (1996) found that children who were more active found greater social success and status among peers. Landers & Petruzzello (1994) are of the opinion that exercise is related to positive mental health. They conclude that exercise may be a relief for depression and anxiety. They also suggest a definite relationship exists between exercise and improved mental health. Goodwin (1999) states that physical education classes provide a unique opportunity to influence a student's self-esteem. Goodwin also states that self-esteem is recognized as a critical component in the adoption of positive health behaviors. Physically active students are also more likely to miss fewer days of

school because of illness and exhibited greater academic achievement (Keays & Allison, 1995). Physically active students are also less likely to become involved in delinquent and criminal behavior (Calfas & Taylor, 1994).

Some researchers (Peirce, 2002) believe that children who receive daily physical education seem to outperform inactive children in motor fitness, academic performance, and positive attitude toward school. This same researcher also suggests that the same physical activity that fights obesity will stimulate better thinking and academic success. Greenough and Anderson (1991) and Lawler (2002) also support Peirce's findings by reporting that exercise not only shapes up the muscles, heart, lungs, and bones, it also strengthens the basal ganglia, cerebellum, and corpus callosum, all key areas of the brain.

There is other evidence for the potency of physical movement. It is known that much of the brain is involved in complex movements and physical exercise; exercise is not just "muscle work." In fact, depending on the type of workout, the part of the brain involved in almost all learning, the cerebellum, is in high gear (Middleton and Strick, 1994). In a Canadian study with more than 500 schoolchildren, those who spent an extra hour each day in a gym class far outperformed at exam time those who didn't exercise (Hannaford, 1995). Dustman's research (Michaud and Wild, 1991) revealed that among three test groups, the group that participated in the most vigorous aerobic exercise had improved short-term memory, reaction time, and creativity. According to Jensen (1998), all K-12 students need 30 minutes a day of physical movement to stimulate the brain. Martens (1982) reports that when physical education instruction time was increased to one-third of the school day, academic scores went up.

There is similar evidence to show that physical activity can positively influence other health-related behaviors. Harris & Gurin (1985) in a survey, for example, showed that regular exercisers were 25% more likely to cut down on salt and sugar; 30% more likely to reduce their caffeine intake; 40% more likely to eat less red meat; 50% more likely to quit smoking; 200% more likely to lose weight; and 250% more likely to eat low calorie foods and drinks than non-exercisers.

### **The New Physical Education**

A recent survey asked adults in the United States what should be taught to students prior to their graduation. Participants specified that information about health was more important for students to learn than content in languages, arts, mathematics, science, history, or any other subject (Marzano & Kendall, 1998). Lawler (2002) states that at his school in Illinois, parents were asked to prioritize every subject. Physical education was rated number one, ahead of science, math, and English. Lawler is not surprised as parents put a high priority on their children's health. Despite this vote of confidence, most schools devote minimal curriculum time teaching students how to lead healthy lives. Allensworth & Kolbe (1987) says that to provide health life-style education, a quality program of physical education must be a core requirement in all schools and a central component in a comprehensive health program. This program should be a health-related physical education program. Lambert (2000) also states that physical educators as well as all other educators must rethink how physical education can help students lead healthy lives. This can be accomplished by having teachers instruct toward learning, not just organize for participation.

The belief by physical education professionals in the mid-1970s was that the needs of children were being overshadowed by the emphasis on athletic ability in youth testing (Pate, 1983). During the 1980s, the shift toward a health-related emphasis in fitness programs was on the rise. According to Pate & Shephard (1989), this shift in paradigms from athletic ability or motor skills physical fitness to health-related fitness attributes was “one of the most significant developments in the history of United States Physical Education” (p. 12). Children’s levels of physical fitness have become important public health goals of the nation (United States Department of Health and Human Service, 1991; McGinnis, 1992). Health-related physical fitness is comprised of five components: cardiovascular endurance, muscular endurance, muscular strength, flexibility, and body mass composition. This type of physical fitness emphasis is in contrast to the motor-sports fitness emphasis from the 1950’s to the earlier 80’s. This type included attributes of balance, speed, agility, coordination, and power. According to Pangrazi (1998), health-related fitness is achievable by all participants while success in motor-related fitness might only be achieved by those few who were born with the necessary skills for sport fitness. Lambert (2000), Staffo (1991) Treanor & Housner (1999) (Graham, 1999), and Sadler (1992) are among a growing group who also support health-related physical education instruction.

Other proponents of this new wave of physical education paradigm have identified problems related to fitness in physical education and offered some solutions. Corbin (1987) asks, “would you buy a membership in a club which required you to wear a specific uniform, continually repeated activities you don’t like, and required you to get showered

and dressed in three minutes or less?" (p. 52). The answer seems obvious. One response to new information on the relationship of physical activity to health has been to recommend that the promotion of lifelong physical activity and fitness should be the primary goal of physical education (Pate & Hohn, 1994a). This goal would be accomplished through what Simons-Morton, Taylor, Snider, and Huang (1993) call health-related physical education (HRPE). Such a program would accentuate teachers' and children's fitness knowledge, attitudes, and practices by emphasizing participation in lifetime physical activities.

Sallis, McKenzie, and Nader (1997) investigated a health-related physical education program using 955 fourth and fifth grade students from seven schools in Poway, California, a suburb north of San Diego. This study used the SPARK (Sports, Play, and Activity Recreation for Kids) model physical education program. This study was designed to increase physical activity during physical education classes and outside of school. Seven elementary schools were assigned to one of three conditions. These conditions were: 1) schools in which physical education classes were taught by physical education specialists, 2) schools in which physical education classes were taught by regular classroom teachers who were given an intensified in-service training program, and 3) schools in which physical education classes were taught by regular classroom teachers with no additional physical education training. The outcomes from group two, the classroom teachers whom taught their own physical education, were favorable for instilling and practicing health-related fitness attitudes and behaviors, especially for after-school hours. This research also

indicated that elementary classroom teachers, when provided with adequate training and support, could improve their knowledge and expertise of teaching physical education.

The document entitled *Healthy People 2010: National Health Promotion and Disease Objectives* (United States Public Health Service, 2000) was released by the US government as a strategy to improve the health of all Americans. The intent of *Healthy People 2010* is to increase the activity and physical fitness levels of children so that when these children grow up, they will still be involved as adults in life-long physical activities. This document establishes achievable and realistic goals and objectives. A majority of the 300-targeted goals are specifically directed toward improving the health status of U.S. children and youth. The goals center on reducing health risks and accentuating preventative approaches for a healthy life-style. Several of the objectives in the physical activity and fitness areas emphasize increasing the amount of time children age six and older participate in "light to moderate activity" (i.e., activity that advocates cardiovascular fitness, muscular strength and endurance and flexibility). Much of the emphasis on improving the health of youth can be accomplished through the enhancement of school programs. Importance is placed on offering the health benefits of exercise and activity to all students as compared to systems that only reward students who are physically endowed with talent.

The release of the Surgeon General's Report on Physical Activity and Health (United States Dept. Health and Human Services, 1996) documented many health benefits achieved through moderate and regular activity. The report showed that people of all ages, both male and female, benefit from regular physical activity. Never before had a

body of research been compiled to show the strong necessity for activity and fitness in the lives of youth. Activity programs are a categorical mandate for healthy youngsters. Using this report, Wechsler (1997) also suggests that one does not need to be an Olympian to be healthy. One only has to be physically active for 30 minutes per day. She emphasizes that these activities can be of moderate intensity, such as walking briskly, jogging, or biking. The importance of physical activity, from the health-related physical education philosophy, is to raise the heart rate in order to build a stronger heart and build a more efficient cardio-respiratory system.

According to Zwiren (1992), “for elementary school children to improve positive health status, the emphasis should be on increasing energy expenditure with physical activity of lower intensity than is recommended for increasing maximal oxygen uptake, but of longer duration and greater frequency” (p. 106). In other words, one should be able to exercise with less intensity, but for longer and more frequent exercise periods. This declaration makes the case that elementary school physical education is significant and meaningful in the lives of American and CNMI youth. Wall and Murray (1994) affirm that in order to maintain or increase one’s fitness level, at least twenty minutes of activity which increases the heart rate significantly is necessary three or four times a week. Daily physical education classes are essential if this objective of increased fitness is to be realized and continually practiced during one’s lifetime. Sallis and McKenzie (1991) state, “the cry is for physical education programs to adopt health-related physical activity and physical fitness goals” (p. 124). Zwiren suggests that the school system should be targeted as a major change agent because the school environment should encourage physical activity for

all students and promote the development of physically active life-styles. Kihl (1992) also believes that schools should advocate and promote comprehensive health and physical education programs that provide and encourage physical activity at every opportunity.

#### Promote Learning and Develop Attitudes

The first step in becoming physically fit and promoting positive attitudes toward fitness is learning the concepts and principles of health-related physical fitness (Adams & Brynteson, 1992; Nahas, 1992). Students should be made aware of the importance of learning about physical fitness (Merkle & Treagust, 1993) and they should be taught about the health benefits and principles of health related physical fitness in physical education classes. Petray (1994) stated that physical education programs should include cognitive objectives that emphasize students' appreciation of health and physical fitness. A major goal of the health-related physical fitness component of the physical education profession is to provide students with knowledge, to develop positive attitudes and skills that will allow them to develop healthy lifetime habits.

A 1987 resolution introduced in the United State Congress mandated that more emphasis be placed on the teaching of physical education. This resolution (House Congressional Resolution 97) was to encourage state and local education departments to provide daily, high-quality physical education programs. The resolution affected children and youth from kindergarten through grade twelve (Siedentop, 1998).

A 1992 report by the National Association for Sport and Physical Education (NASPE, 1992) revealed some fascinating information about the relevance of the 1987 resolution. Siedentop reported:

1. Slightly more than 75% of states require physical education in grades K through 6, but over half the states that have such requirements specify no time or activity guidelines. In other words, although physical education is required, schools can do virtually anything to meet the requirements; for example, recess and class playtime can be labeled as physical education (p 246).
2. In 1993, only six states required elementary-school students to take physical education 30 minutes per day, five days a week, but this number was up one state from 1987 (p. 246).
3. Time-based regulations (30 minutes daily, 60 hours per year, etc.) still dominate elementary physical-education requirements (p. 247).

**The Surgeon General's Report on Physical Activity and Health (USDHHS, 1996)**

stated that school based involvement in enhancing physical activity has shown success in increasing physical activity. Every attempt should be made to encourage schools to require daily physical education in each grade level.

As a resource for teachers, AAHPERD offers a physical fitness and assessment program called "Physical Best," (Staffo, 1991) which encourages elementary children to make positive health/fitness behavior changes that should last a lifetime. In this program students develop their own individualized fitness programs, monitor their own progress, and receive personal achievement awards as they advance. The National Association for Sport and Physical Education (NASPE, 1992) supports the new health and fitness philosophy with its "Basic Stuff" series, resource materials designed to keep school practitioners up-to-date on the new concepts of an expanding body of knowledge. In addition to changes in the content of physical education programs, organizations are advising that students spend more time participating in the recommended activities. For example, the Council on Physical Education for Children, a subdivision of NASPE,

advocates that K-6 students participate in an instructional program taught by a certified physical educator for a minimum of 150 minutes per week, exclusive of recess.

Simons-Morton et al. (1993) scrutinized the physical activity of fifth-grade students during physical education classes. Students were chosen from 355 elementary schools in a single Texas county. These students were observed during their physical education classes. The researchers found that only 8.5% of class time was spent in moderate to vigorous physical activity, 23% in minimal activity, and 68.1% in sedentary activity. It was also found that 140 minutes were spent in physical education weekly, but less than 10% of class time was dedicated to moderate to vigorous activity during elementary school physical education classes. It was concluded that unless a large portion of the class was devoted to moderate to vigorous physical activity, daily physical education would not increase the amount of physical activity children engage in. Thompson (1990), the chairman of the Health, Physical Education, and Recreation Department at the University of North Carolina at Pembroke, investigated the lack of student movement within a typical physical education class by assigning a Tests and Measurement class to analyze the exact amount of time that each student actually moved in an hour-long physical education class of softball. Unbelievably, the average amount of time that each student moved in that time-period was less than two minutes and for the vast majority of the period, students did nothing more than stand or sit! Thompson (1990) concluded by asking if physical educators do not include an element of physical fitness in each lesson plan, where will the average school child receive it?

Health and fitness contributes to the quality of human life. Programs need to begin early if they are to be of real value. The purpose of physical education is to help children become responsible for their own health and fitness by teaching them to exercise properly, develop personal exercise habits, and help them become involved in and enjoy regular aerobic exercise (Sander, Harageones, Ratliffe, & Pizarro, 1993). Physicians, educators, and fitness experts have challenged the fitness levels of youth. Children need assistance and guidance in order to develop concepts of healthfulness concerning their fitness and wellness. Administrators and educators need to discover what works and what needs to be altered to produce life-changing results, and they must evaluate curriculum in the school systems against these criteria.

The American Heart Association (AHA), also maintains that children must be introduced to the principles of regular physical exercise and recreational activities at an early age. Schools at all levels must develop and encourage positive attitudes toward physical exercise and provide children with the opportunities to learn physical skills and perform physical activities, especially those that can be enjoyed for many years. The AHA continues by indicating that the school curriculum should not over emphasize sports and activities that selectively eliminate children who are less skilled. Schools must teach the benefits of exercise and the development and maintenance of exercise and exercise conditioning throughout life to all students. Bly, Jones and Richardson (1986) and Iverson, Fielding, Crow and Christenson (1985) maintain that organized school programs are not only practical but also successful. Fletcher (1996), writing for the AHA, points out that research on improved and enhanced competent physical activity interventions that

improve long-term adherence to a physically active life-style is needed immediately.

Innovative, nontraditional methods of increasing physical activity in the community and education system must be developed, implemented, and evaluated.

Pangrazi (1998) reports an interesting fact concerning physical fitness. The United States President's Council for Physical Fitness devised a physical fitness test that has been used since the 1960's. This test evaluates five different motor-skills. Each child must pass all six of the tests at or above the 85<sup>th</sup> percentile in order to earn a badge. The low success rate of individuals who pass the U.S. President's Fitness Test is astounding. The success rate for boys who achieve the 85<sup>th</sup> percentile on the battery of tests is one tenth of one percent or one out of 1000. The success rate for girls is only slightly higher, three tenths of one percent or three out of 1000. The implication of this statistic is that 999 boys out of 1000 who took the test are considered failures and 997 girls are failures. It is no wonder adolescents' attitudes concerning being physically active and fit dwindle as they mature. Other fitness tests, that have success rates superior to .03% and .01%, and still test an individual's fitness level need to be developed, either as the sole fitness test or in combination with the U.S. President's test. Health related tests (Curtner-Smith, M. D., Chen, W.1995) might be more conducive to measuring an individual's fitness level than motor-skill related tests. Health related tests tend to allow for personal achievement, thus also dealing with the emotional or self-esteem aspect of the individual.

In a study by Gillima (1982), the intensity of voluntary activity patterns of 59 children was analyzed by recording heart rates. Results showed that children do not voluntarily engage in high-intensity activity and that prior to intervention, the training heart

rate, at least 160 beats per minute, was never reached. The authors concluded that daily activity patterns can be changed, and added an average of 35 minutes of high-intensity activity to the children's daily activities. Their contention is that coronary heart disease can be decreased through increased cardiovascular activity. They offered the following guidelines for better use of recess time for enhanced activity.

1. Set up an exercise trail on the school grounds. Encourage children to use it during recess, and record their accomplishments on a classroom chart.
2. Set up a large clock with a second hand on the playground and encourage children to check their pulse rate periodically to see if it is in the training zone.
3. Encourage all children to walk or run around the school playground before participating in recess.

Regardless of the approach used to increase activity, children seldom perform intense activity during free and leisure time. It is important that school administrators understand this point and realize that recess is not a substitute for physical education.

Mandigo and Thompson (1998) studied intrinsically motivated individuals to understand how educators could motivate children to be more physically active. They noted that an internally motivated individual tends to be one who finds the activity rewarding because it is enjoyable and they value being able to do it. Any extrinsic reward (e.g., trophies, badges, or pleasing others) that is used to control, or is perceived as being controlling, impairs that participant's intrinsic motivation to perform the activity. They concluded that in order to reverse the trend of inactivity, it is important that physical activity practitioners and the education administration work together to develop quality

physical activity programs that will attract and keep young people physically active, primarily on their own initiative.

### Building Physical Education Programs to Meet Student Needs

Dr. Donald Rubinstein, (Eugenio, 2000) keynote speaker for a health symposium held on Saipan in March, 2000, stated, “control over one’s own health for people today is more a matter of individual and cultural choice than perhaps at any time in the past.” He accepts that citizens of Saipan (Pacific Islanders) will have a difficult time changing the cultural dietary habits, fiestas, and daily inactivity patterns that contribute to the increasing rates of diabetes and other kinetic diseases. He happily declared, however, that it is possible. He advocates that changing the life-style which many people of Saipan choose to follow will reduce the incidence of diabetes and other chronic diseases. This can be done at an early age by developing physical education programs to meet student needs.

Saffici (1999) insists that physical education programs must change and adapt to meet the needs of all students, or physical education will not succeed in being an integral part of the education curriculum. He concludes that a large number of students are bored and find no relevance in physical education classes. Many of these “indifferent” students are participants in physical activity in and out of the school context. Physical education cannot be reduced to a secondary subject, while other scholastic subjects retain the status of primary importance. He proclaims that physical educators need to be equipped with an understanding of the world beyond the gym and the playing field. PE teachers will need to recognize their role as important contributors to society and as service-oriented

professionals. This requires that they place academic and ethical accountability on the same plane as health and motor-skills aspects of physical education.

The United States Department of Education published *America 2000: An Educational Strategy* in 1991. Sadler, Tentinger, and Wiedon (1993) indicate that by presenting this document to the American public, the federal government has taken a step toward increasing its participation in educating American's children. Furthermore, this participation will go beyond the common and established capacity of just providing financial support. In this document, the government outlined six national goals. Although physical education is not listed as a priority, direct implications exist for its incorporation.

In order to meet the challenge of saving future generations from health-related dilemmas, physical educators must modify their school's physical education programs (Smith & Cestaro, 1992). The newest version of Healthy People is called Healthy People 2010 (United States Public Health Service, 2000). Its national health objectives proclaim the need for increasing the number of children obtaining regular physical activity and taking part in physical education classes. This report lists the following specific objectives relative to physical activity and fitness (United States Department of Health and Human Services Public Health Service, 2000):

1. Increase to at least 85 percent the proportion of people aged 5 or older who engage in vigorous activity at least three days a week for 20 minutes or more.
2. Increase to at least 25 percent the number of all junior high schools which require daily physical education or physical activity.

3. Increase to at least five percent all senior high schools that require daily physical education or physical activity.
4. Increase to at least 50 percent the proportion of children aged 6-17 who participate in daily physical education.
5. Increase to at least 50 percent the time spent in physical education classes in lifetime fitness activities and moderate to vigorous activities.
6. Increase to at least 75 percent the proportion of children ages 6-17 who view television for two or fewer hours per day.
7. Increase to at least 75 percent the Nation's public and private schools providing access to their physical activity spaces and facilities for all persons outside of normal school hours (that is, before and after the school day, on weekends, and during summer and other vacation periods).

The primary purpose of physical education classes should be to accommodate children's interests, desires, and feelings while still meeting the goals of furthering attitudes, skills and fitness development (Weiller & Richardson, 1993). The American Academy of Pediatrics' Committee on Sports Medicine and Fitness and the Committee on School Health have gone on record as supporting a comprehensive physical education program for children in grades K through 12. This program emphasizes participation in enjoyable physical activities. It also helps students develop the knowledge, attitudes, motor skills, behavioral skills and confidence needed to adopt and maintain physically active lifestyles (American Academy of Pediatrics, 2000). McKenzie, Alcaez, Faucette, and Sallis (1998) report it is critical that children learn fundamental health-related physical fitness

skills early in life. These fundamentals are a prerequisite to successful participation in many sports, and are associated with increased physical activity that continues into adulthood

As Sadler et al. (1993) assert, physical educators need to recognize the opportunity for intensifying and strengthening each child's total learning experience and to do so by keeping physical education in the mainstream of formal, academic education. To accomplish this objective, selected changes need to occur that include:

1. Recognition of physical education, particularly health-related and aerobic skill development, as a viable component of national education policies.
2. Institutional endorsement of multidisciplinary activities borrowing from the expertise of all teachers and available resources.
3. Development of teacher preparation programs that focus on fundamental and essential health behaviors and lead to acquisition of aerobic and life-long fitness skills for all students.
4. Public relations efforts to disseminate the benefits of wellness to the entire community.
5. Integration of wellness concepts into a broad range of subjects in the curriculum.
6. Refocusing the upper secondary physical education program away from sports performance and toward aerobic and lifetime fitness programs.
7. Adoption by school boards of NASPE's outcomes and benchmarks (1992) for a comprehensive physical education program, (pp. 80-81).

Wechsler (1997) welcomes the new physical education philosophy that is sweeping across the United States. This new approach is designed to meet the needs of all students, regardless of their level of expertise in motor skills. With this new approach toward physical education, all students can become active instead of intimidated by the more athletic gifted students. There are many new programs in hundreds of schools across the US that have determined what it takes to make physical education modern and to go beyond, traditional team and individual sports. Now, one can be active by being involved with enjoyable activities that one can choose and are fun, such as walking, dancing, aerobics, biking, and hiking. Physical educators and school leaders need to provide a physical education program that reaches the overwhelming majority of students so that they can leave physical education class feeling good about themselves. Wechsler (1997) advocates that schools, physical educators, and principals, in conjunction with each other, maintain or reinstate a minimum physical education requirement and support physical activity programs that serve young people who are less likely to be active.

Support is beginning to mount to stop the practice of extrinsically rewarding students who do well in other phases of school with doughnuts, ice cream, and candy, while at the same time, punishing students who misbehave by requiring them to run laps around an athletic field or do fitness skills. Schools should use physical education as an incentive by giving students more opportunities to be physically active as a reward, not as a punishment. Stillwell and Willgoose (1997) support Wechsler by reporting that it is the physical education curriculum that provides not only the context for teaching, but also the structure for student learning.

Mandigo (1996) also supports this new emphasis toward the teaching of physical education. He tested a total of 657 boys and girls from 11 schools and 29 boys and girls from one recreation program in order to investigate the components of fun within physical education. He found that when fun was injected into a physical education program, differences between individuals disappeared, with the exception of grade, while the program variables virtually stayed the same. An empirical connection between fun and flow was also uncovered, and fun was found to be highly correlated with the participant's desire to continue participating in physical education classes.

One reason cited for people not exercising regularly is due to a lack of adequate knowledge of physical education concepts (Steinhardt & Stueck, 1986). This lack of physical education knowledge has motivated professionals in the field of physical education to question the feasibility of physical education programs taking responsibility for making children fit (Michaud & Andres, 1990). In the late eighties, Blackwell (1989) and Kopperud (1986) saw attaining physical fitness as a central curricular issue and the primary goal of at least the elementary physical education program. Michaud and Andres (1990) disagreed by stating that physical education programs should focus on the positive relationship between physical activity and health and establish a basis for lifelong participation in physical activity. Regardless of the position taken, both sides support physical fitness as a major component of the physical education curriculum, either as a series of activities leading to physical fitness or as exposure to concepts that promote physical activity and fitness. Some professionals believe (Ross et al., 1985; Strand, 1992) low fitness scores will continue if the health-related physical education model does not

replace the traditional sport skill model of physical education. One reason given for the reluctance to change is that many physical education teachers complain that they only know how to teach motor and sport skill activities in their respective physical education programs. Thus, a two-pronged approach to this dilemma is needed. An in-service training program on the new philosophy of modern physical education linked to wellness and health-related components is necessary for physical education teachers aligned with the old paradigm of physical education. Second, a change in physical education programs to develop and prepare teachers in teaching physical education needs to be aligned with the new paradigm of health related physical education (Barnett & Merriman, 1994).

Neal Peirce (2002) supports the new physical education that focuses on fitness, agility, nutrition, and practicing and developing a healthy life-style. Weight lifting, rock climbing, skating, roller-blading can be not only fun, but are also activities that one can still enjoy and participate in at the age of 70 as well as at 20 years of age. Peirce also suggests that many readers may identify with the “same old” physical education classes of regimented calisthenics, endless laps around a field, or trying to participate in activities that only a few natural athletes excelled in while the majority of the class felt like failures.

Penny and Chandler (2000) believe that activities are not what physical education is primarily about. Rather, they say the professional responsibility of teachers is to focus on the education of children in and through physical activities and contexts; the availability of opportunities for all children to experience enjoyment and success in physical education classes; and for children to gain the skills, knowledge, and appreciation that will be a foundation for them to lead active and healthy lives. Furthermore, teachers who teach

physical education have the responsibility to provide educational experiences that establish children as inventors, not merely receivers of knowledge, skills, and concepts.

Lawler (2002) indicates that physical education classes and physical fitness testing will be dramatically different in the future. Students' fitness levels will be tested with a computer that measures blood pressure, body composition, and even cholesterol. Students will have the opportunity to play video games while riding stationary bikes. The faster a student pedals, the faster the bike moves around the screen. Students are now becoming physically fit while at the same time doing what they have enjoyed doing for years, playing video games. This type of future physical education classroom now exists in Illinois and a few other states.

Teachers who refuse or who are lax in upgrading their knowledge and practices with innovative ideas in physical education may be using obsolete and out-dated material. The refusal or lack of self-motivation in keeping current with new ideas in physical education can be of little positive benefit to students. Kelley and Lindsay (1977; 1980) put forth a theory of obsolescence of knowledge. They indicate that obsolescence, or deterioration of knowledge, can begin shortly after a teacher graduates from college and often continues during their years of teaching. They also state that without intermittent opportunities to be exposed to and kept abreast of new physical education ideas, practices, and innovations, one's knowledge becomes obsolete and outdated. Kelly and Lindsay recommend attending periodic in-service training sessions to inject new ideas into one's knowledge, attitudes, and practices.

Another concept concerning teacher's knowledge and practices is presented by Schempp (1989) and Ennis (1994). Schempp states that classroom teachers' acute awareness and ideas about the nature of physical education are built up across years of quality participation, or lack of quality participation, in school-based physical education programs. A teachers' participation in good elementary physical education programs as a child cultivates good attitudes toward physical education while a teacher's participation in poor physical education programs creates poor attitudes (Ennis, 1994). Poor attitudes toward and understanding of physical education are often resistant to change and remain largely impervious to teacher education programs (Doolittle, Dodds, & Placek, 1993). Though new knowledge may be obtained through teacher education, when this knowledge is found to be inconsistent with the individual philosophy of physical education, knowledge rejection takes place and the beliefs accumulated over a lifetime of experience, whether positive or negative, begin to resurface and take over (Lawson, 1983). Knowledge may be eroded if teachers have restricted opportunities to teach health-related physical education due to environmental factors such as class size, lack of equipment, limited time, or too much time spent managing and monitoring student activity rather than instructing (Metzler, 1989).

The relationship between a teacher's knowledge and practices is also discussed in Allison & Barrett's book, "Constructing Children's Physical Education Experiences: Understanding the Content for Teaching" (Allison & Barrett, 2000). These authors note that knowledge may also be diminished with an overemphasis on how to teach. They further state that if what one is teaching is educationally unsound, developmentally

inappropriate, and dangerous, then how well one delivers such careless content is irrelevant.

### **Role of Elementary Classroom Teachers in Teaching Physical Education**

Having classroom teachers' handle elementary physical education is becoming increasingly common in many school systems. In some schools, however, the plan has been to utilize only physical education specialists to implement physical education programs. Frequently, the hiring of specialists is prohibitive for financial reasons. Therefore, some elementary schools ask classroom teachers to take on the additional responsibility of the physical education program. Between these two extremes there is a third pattern that is rapidly gaining recognition as a more satisfactory alternative. That plan is to use a physical education specialist to coordinate physical education curriculum with the classroom teacher. The two are expected to work together, both in planning the program and in carrying out the teaching responsibilities.

Pissanos and Temple (1990) found that a specialist along with a classroom teacher teach one out of ten elementary school students' physical education classes in the United States. This study by Pissanos and Temple indicates that elementary school classroom teachers, with the appropriate curriculum and professional guidance, can effectively improve the fitness levels of their students. The statistical results also show that classroom teachers generally placed more emphasis on cardiovascular activities than on activities which would contribute to abdominal muscular strength and endurance or flexibility. Pissanos and Temple also suggest that these teachers' cardiovascular endurance enhancing

activities are simply running laps as compared to providing more complicated and time-consuming activities that build muscular strength and endurance and enhance flexibility.

In another related study, Helm & Boos (1996) indicated the need for physical educators to act as consultants and trainers for early childhood programs. The researchers (Helm & Boos) substantiated that through teamwork and coordination with physical education specialists, the physical development of 375 children was positively impacted. The impact extended beyond the time that the children spent in the activity room because the teachers, who had the most constant and consistent contact with the children, had come to value and understand developmentally appropriate movement experiences. By expanding the role of the physical education specialist through partnership with classroom teachers, the physical education program can have an impact on the education and wellness of children within the community.

The National Association of Sports and Physical Education (NASPE) in 1993 found that a high percentage of elementary classroom teachers do teach physical education to their students (Bowyer, 1996). Therefore, it is vital that these classroom teachers not only oversee a quality program, but also have a positive attitude that champions physical education in the curriculum.

A study of rural school physical education by Reif and Coulon (1994) suggests that the hiring of a physical education specialist is unlikely in rural schools due to budgetary constraints. An alternative method has been suggested for improving physical education programs through collaborative efforts of schools and universities. University faculty focus on three factors in assisting implementation of an effective staff development program:

performing a needs assessment, conducting in-service training, and providing follow-up assistance after training.

A more recent study by Bowyer (1996) indicated that instructors of pre-service teachers should develop in those teachers sensitivity to the varying skill levels among students. This in turn would help the pre-service teachers develop positive attitudes regarding the importance of physical education in the school curriculum.

Additional studies regarding pre-service and in-service physical education components reveal the importance of these sessions. Pearman & Valois (1997) report that research findings on required college health and physical education classes for all students, regardless of their major, revealed a positive increase in health-related attitudes, knowledge, and behaviors. Pearman & Valois state that a number of pre and post studies have attempted to compare students who completed such a required health and physical education class with students who did not participate in this type of class. These researchers state that the results vary among the studies, but the findings suggest that students who are exposed to a required class improve with respect to their health knowledge, attitudes, and behaviors over the course of a semester.

Nahas (1992) studied knowledge and attitudinal changes of low-fit college students following a short-term fitness education program. His findings support the implementation of regular short-term, in-service type courses on health and fitness concepts as a means to improve knowledge and attitudes. His findings also indicate that practicing the information presented in class is more effective in changing knowledge and attitudes than receiving handouts and taking notes in a lecture.

Miller and Housner (1998) performed another study that supports the positive effect of pre-service and in-service training. They concluded that teachers of physical education should have sufficient knowledge and pedagogical skill in the area of health-related fitness to provide high quality instruction. These researchers state that over a period of time, knowledge may be lost if not continually used. Miller and Housner conclude that many opportunities are available for updating teachers' information. Teachers could learn and update their knowledge in many professional meetings. Teachers can learn new information by working on mandatory continuing education units (CEUs). Teachers can stay current with new ideas, refine skills, and maintain previously learned knowledge and could use these CEUs from local colleges and universities or in-house, in-service training programs.

Coulon and Reif (1994) state that, ideally, physical education instruction at the elementary level should be taught by a physical education specialist. They observed that in many school districts, the specialist's instructional duties are spread across several schools, and in others the instruction of physical education is the sole responsibility of the classroom teacher. Faucette & Patterson (1989) believe that classroom teachers who are responsible for physical education instruction often express negative attitudes toward the assignment, and classroom teachers who believe that physical education is of little value to learners compared to other subjects, are not willing to dedicate the necessary time to gain the appropriate knowledge for effective physical education instruction.

Coulon and Reif (1994) examined the positive effect curriculum in-service development had on the improvement of instructional practices of classroom teachers

teaching physical education. Their study focused on a rural Northeastern school district where elementary self-contained classroom teachers were responsible for physical education instruction. These teachers believed their physical education curriculum consisted mostly of group game activities and the present curriculum was not meeting state standards, nor was it meeting the needs of the district's students. This particular school district had no physical education specialist and the individual classroom teacher made all physical education curricular decisions. Reif and Coulon (1994) concluded that the combination of a well trained classroom teacher and an effective specialist who provides meaningful and relevant in-service training may be the most realistic way to achieve the goal of daily, quality physical education instruction when qualified physical education teachers are not available.

In-service training, as indicated by various studies, is a valuable tool in providing a platform for teachers to learn new concepts and skills, upgrade their current knowledge, and acquire new practices and techniques. Teachers can then present this information to students in the most efficient and effective method.

#### **Related Studies on Teacher Training for Effective Physical Education Instruction**

There has been limited research into how classroom teachers' perceptions and knowledge of physical education influence their teaching of physical education. This small body of research (Allison, Pissoanos, & Sakola, 1990) supports the idea that early physical education experiences - - those prior to undergraduate preparation - - are influential in the formation of classroom teachers' perceptions of physical education. This same study found that there are six basic factors which affect classroom teachers' attitudes toward

physical education: (1) success, (2) embarrassment, (3) physical injury, (4) gender equity, (5) special events and equipment, and (6) teachers. In the opinion of these authors, if elementary school teachers are to teach physical education, they should spend time in their pre-service and in-service physical education methods course confronting and critically examining their own physical education institutional approach. In other words, these teachers should build up their understanding of physical education knowledge, concepts, and techniques.

Related to this study is a study by Thornton (2001). He was concerned that elementary school teaching imposes special burdens on teachers because they assume responsibility for all subject matters across the curriculum. He states that teachers must be equally proficient in methods as well as knowledge. Methods or practices would be the scope and sequence of the curriculum, the organization of the courses and the lessons, the materials of instruction, and the styles of and procedures for teaching. He is of the opinion that teachers must not only know the subject matter they teach, but they must also know suitable methods to transform it for purposes of instruction. Thornton also theorizes that method counts where it most matters in teaching: the classroom where good teaching practices and methods usually are the difference between effective and non-effective instruction. He concludes that if teachers' subject knowledge and methods were not acquired during the undergraduate years, other training programs need to be provided to bring deficient teachers up to an acceptable degree of effectiveness.

Reif and Coulon (1994) studied classroom teachers' attitudes toward the teaching of physical education. They surmised that if teachers had negative attitudes toward

physical education this would likely lead to dropping physical education from the day's schedule or to permitting students to have free play activities as a replacement for structured physical education. When these same teachers did teach physical education, the activities were frequently simple, unplanned, and unstructured games such as relays, kickball, dodge ball, and tag games. Faucette, McKenzie, & Patterson (1990) also share this opinion and believe that these unstructured game type activities are ones which provide limited opportunities for students to practice motor skills and develop adequate levels of physical fitness.

Classroom teachers believe that their ineffectiveness in teaching physical education is a consequence of receiving insufficient pre-service or in-service training (Reif & Coulon, 1994). As a result of this lack of training, many classroom teachers express negative attitudes toward teaching physical education, citing their beliefs that: (a) physical education is of little value compared to other subjects, and (b) to adequately prepare for and instruct a physical education class takes too much time and energy, which in turn takes time away from other responsibilities.

McKenzie, Sallis, Kolody, and Faucette (1997) examined three different situations in which the teaching of physical education is carried out in elementary grades. They concluded that a physical education specialist produced the best learning outcomes. Trained classroom teachers were significantly better than their untrained peers. Their findings indicated that in-service training that is extensive, particularly in the first year, and is followed by periodic on-site support by a trained physical education specialist produces the most effective physical education teachers. Their conclusion is that elementary

physical education can be improved with a program that is feasible in real-world settings. Health-related physical education curricula, with effective in-service teacher training and support, have the potential to provide children with much more physical activity than they receive in typical physical education classes and this increased physical activity is expected to contribute to multiple health benefits for youth.

A study by Sallis, McKenzie, Kolody, and Curtis (1996) assessed the District Administrators' Perceptions of Elementary School Physical Education. They looked at district administrators' perceptions of elementary school physical education in California, which contains 12% of all US children. One hundred ten school districts were selected at random. Their findings suggested that:

1. Many district administrators have little experience with physical education specialists. Most of these California administrators (54%) provided leadership in districts that had no physical education specialists at all. The situation is similar in other states (NASPE, 1995).
2. Administrators already believe that high-quality physical education will improve educational outcomes. Championing physical education because it heightens academic achievement is a great beginning point when making a case to administrators.
3. Teacher training and motivation are key ingredients for a high-quality physical education program. Administrators citing the lack of teacher training as the main barrier to high-quality programs is probably related to their districts' reliance on classroom teachers to instruct physical education. New roles for physical

education specialists can be devised with programs developed to train, motivate, and support classroom teachers who teach their students physical education.

4. Program outcomes need to be written to show that time spent in a physical education class is well spent. Program effectiveness and assessment need to be priorities.
5. Many administrators plan to make improvements in their physical education programs. The physical education progression must provide programs with documented benefits for children and deliver appropriate training for classroom teachers.
6. Administrators want to adopt physical education programs with effective curricula and clear goals. A state framework or other document that contains a clear and realistic mission statement would encourage administrators to adopt programs consistent with this mission.

This survey shows that assessing the perceptions of decision-makers can lead to strategies for improving physical education for our children. While this survey was only conducted in California, which contains approximately 12 percent of the nations' school children, it is believed that some of the administrators' perceptions are shared by administrators in other states, particularly those in which elementary classroom teachers have the responsibility for teaching their own physical education classes.

Jones (1999) studied the attitudes of Lutheran elementary classroom teachers toward the teaching of physical education to their respective homeroom classes. A written survey and semi-structured interview were used to gather data from fifty-three Lutheran

teachers who completed the Likert scale questionnaire and five teachers who were selected for interviews. Her findings indicate that physical education should be viewed as an organized class period and when taught consistently and correctly, the “total” child is developed. Jones (1999) also states that factors that greatly influence a teacher’s attitude toward teaching physical education are space, time, equipment, resources, and preparation time. Jones also establishes that pre-service and in-service training sessions are helpful in maintaining positive attitudes toward the teaching of physical education. This study, however, points out those classroom teachers who do teach their own physical education classes desire the assistance and guidance of a full-time physical education specialist.

Conkell & Imwold (1992) performed a study on the planning practices and attitudes of physical education teachers. The primary purpose of their study was to examine the attitudes of in-service physical education teachers toward planning. More specifically, the intent was to find out how teachers felt about writing objectives and using a formal approach when planning. In addition, these researchers wanted to explore whether methods changed with experience, and whether extrinsic factors such as workshop and/or conference attendance, grade levels taught, coaching duties, or levels of education influenced how teachers planned. The instrument that was used to collect the data was a questionnaire sent out to selected physical education teachers.

The overall findings from Conkell & Imwold indicated that most teachers believe that there is a positive relationship between planning and effective teaching and most planning procedures were based on a theoretical planning model. Results also revealed that teachers in this study believe that lesson planning was important for effective teaching.

Graber (1998) studied the influence of teacher education on the knowledge and behaviors of a teacher in her third year of teaching high school physical education. Graber established that the teacher was only provided with the principles of good pedagogy, not the operations for executing effective teaching practices or behaviors. Graber concludes that a teacher's knowledge can be established with a pencil and paper answer test, but attitudes and practices are more difficult to measure. She also concludes that many teacher education programs are highly successful in terms of communicating an ideology about teaching, but a failure in that appropriate, practical skills are not emphasized in the curriculum.

### **Summary**

Schools that engage in regular physical education programs for young people could contribute to a reduction in chronic diseases associated with sedentary life-styles and provide a basis for healthy life-styles. Programs that provide students with the knowledge, attitudes, motor skills, behavioral skills, and confidence to participate in physical activity can establish active life-styles among young people that continue into and throughout their adult lives. These programs can promote physical activity by establishing physical activity practices; providing physical and social environments that enable safe and enjoyable participation in physical activity; implementing planned and sequential physical education and health education curricula and instruction from kindergarten through 12th grade; providing extracurricular physical activity programs; providing in-service training in methods to effectively promote physical activity; providing community-based sports and

recreation programs; and evaluating school and community physical activity instruction, programs, and facilities.

Physical education should be an indispensable and fundamental component of school programs and one that leads to improved public health (McGinnis, Kanner, & DeGraw, 1991; Nelson, 1991; Ross, Pate, Corbin, Delpy & Gold, 1987). Based on the evidence that a healthy body promotes a healthy mind, many schools have acknowledged their responsibility to encourage lifetime physical education among young people. Those school districts that are having the greatest success, have implemented physical education as part of a coordinated health-related physical education program, have required students to engage in daily physical activity; have established programs that support the objectives of Healthy People 2010 (USDHHS, 2000; and follow CDC's Guidelines of School and Community Health Programs to Promote Physical Activity Among Youth, 1997). Knowledge and other tools exist for schools to use. It is up to school officials, administrators, and teachers to provide the commitment and positive attitudes to support the health and wellness of succeeding generations.

Accumulated research continues to show that the earliest years of a person's life are the most important in the development of future movement and activity patterns. A child who is active at an early age will probably be active as an adult. A child who is sedentary at an early age will probably be sedentary as an adult.

Doing something about the obvious gap between school physical education and the lack of importance placed on it by adolescents will require more than the supplying of interesting and fulfilling classes (Silverman, 1997). It will require a reexamination of the

nature of physical education that is informed by an understanding of the temperament of the modern world and the place of education, schooling, and physical activity within it. If physical education programs cannot change and adapt to meet the needs of all students, physical education will not succeed in being a valuable segment of the curriculum. Physical educators need to gain an awareness of the world beyond the gym and the playing field. Teachers will need to acknowledge their role as important contributors to society, and facilitating professionals. They must rely on academic and ethical accountability, rather than just the sport or movement aspects of physical education.

It is also quite evident that a classroom teacher who teaches physical education does exert a tremendous amount of influence on the quality and quantity of programs and will be successful with the proper training and having a positive attitude toward the importance of physical education in the curriculum.

The conclusions that can be made from the studies in this chapter are:

1. A well-founded and comprehensive in-service training program to upgrade and increase the knowledge of classroom teachers has been shown to be a practical and effective means of presenting new knowledge (McKenzie, Sallis, Kolody and Faucette, 1997). In-service programs are also important to present new ideas and concepts of physical education curriculum.
2. Health-related physical education is replacing sport-related physical education. Health-related physical education refers to a program where all children can experience success and develop a positive attitude toward a healthy life-style by being active for at least 30-minutes a day. Health-

related physical education indicates a program in which all children have fun in an emotionally safe and friendly environment.

3. Parents are very concerned with the health of their children. Parents want their children to be more active. Parents tend to value more instruction and programs that are connected with their children's health and physical well being (Marzano & Kendall, 1998; Lawler, 2002).
4. The need to get children physically activity is more important today than ever before due to the increase of chronic-type diseases that tend to shorten one's life span. Children who are active in their childhood are more likely to be active throughout their lifetimes. Children who are inactive during their adolescence tend to be inactive during their adult years.

## **CHAPTER THREE**

### **Research Design and Methodology**

#### **Introduction**

The purpose of this study was to determine if there was a significant difference in the knowledge, practices, and attitudes of elementary school teachers who participated in an in-service training program and those who did not receive such training. A quasi-experimental research design was utilized to measure possible changes in these three factors. The study was designed to answer the following research questions:

1. Does exposure to a model health-related physical education program influence or affect a change in attitudes, knowledge, and practices of Saipan elementary school teachers?
2. Do demographic variables, such as gender, grade level taught, number of years teaching, and number of days an individual exercises per week, help explain any changes in attitudes, knowledge, and practices in elementary classroom teachers exposed to a model health-related physical education program teaching physical education on Saipan?

In addition, data was used as a means of validation and determining the reliability of the instrument. The survey questionnaire (see Appendix A) consisted of the following parts:

- A. Demographics: The respondents were asked to answer three demographic questions regarding their gender, number of years teaching, grade level taught, and the number of times they exercise per week;
- B. Attitude: Twenty Likert-scale-type questions measured the respondent's attitude toward teaching of physical education;
- C. Knowledge: Forty multiple-choice questions were used to measure the respondents' knowledge of teaching of physical education.
- D. Practices: Twenty Likert-scale-type questions were used to measure the respondent's practices and methods in the teaching of physical education.

The instrument was used for purposes to establish baseline pre- and post-treatment data.

This study involved a pre- and post-test using a control and experimental group to determine the extent to which the treatment may have influenced experimental group scores. The treatment process was introduced after the control and experimental groups were administered a pre-test. After the treatment had been administered over a two-month period, a post-test was administered to both the control and experimental groups. Sixty days after the post-test had been administered; both groups took the practice section of the questionnaire as a second post-test. The identities of the participants on the pre-test and both post-tests were confidential. Each participant was given a code used to label his or her pre-test and post-tests. This code was only used to calculate the change in attitude, knowledge, and practices and was only known by the researcher. One year after the administration of the post-post-test, the tests were shredded and destroyed.

### **Model Physical Education Program**

A model physical education program was created for use in the CNMI (see Appendix B). This model was developed by utilizing a variety of methods: through the use of interviews with physical education professors at several universities; by investigating and evaluating the required textbooks for physical education methods courses at selected universities; the researcher's own personal experiences of teaching elementary physical education and physical education methods courses while living on Saipan; and the researcher's personal knowledge of island-type activities that are unique to the customs and culture on Saipan. The physical education model includes activities and lecture materials from Pangrazi's 13<sup>th</sup> edition of Dynamic Physical Education for Elementary Schools, (Pangrazi, 2001); Graham's 3<sup>rd</sup> Edition of Themes of Physical Education, (Graham, 1999); SPARK (Sports, Play, and Activity Recreation for Kids, 1997); PE-4-ME, Teaching Lifelong Health and Fitness, (Summerford, 2000); and Let's Move, A Physical Education Program for Elementary School Teachers, (Gallahue and Meadors, 1974). The model was also developed from personal interviews with Dr. Nancy B. Schmidt, Department Chair for Health and Physical Education at the University of Guam; Melissa Fletcher, SPARK Physical Education Director of Educational Services at San Diego State University; and the Northern Marianas College's Health, Physical Education, and Athletics Department faculty.

This model physical education program is designed for appropriate age groups and developmental levels, activities (see Appendix B). This researcher believes that each elementary teacher should know the proper and acceptable progressions for each age

group, as well as the make-up of activities acceptable for K-2, 3-4, and 5-6. For instance, rhythms for a first grade physical education class are different from a fifth grade class in regards to content and percentage of time spent on this activity in the course of a school year.

### **In-service Training**

The Public School System (PSS) was very receptive and supportive in the researcher's efforts to gather data on the attitudes, knowledge, and practices of elementary school teachers and to hold in-service training at the five selected schools. The principals from the selected in-service schools were also receptive to allowing an in-service trainer to visit their respective schools once a week for an eight-week period. However, not all schools received the full eight-week in-service training program. One school, Kagman, closed its school for two weeks in order to fix a potential health hazard. San Vicente used one of their in-service days for an accreditation planning session, while Koblerville missed two sessions due to half of the staff having the flu during March 2001. Tanapag missed three sessions for various reasons. Most training sessions lasted for one and one half hours and consisted of twenty minutes of lecture followed by class participation in various activities, such as folk and square dances, aerobic dances, physical fitness activities, low-organizational and lead-up games, and the like. Almost 100 percent of the 96 elementary teachers in the training group attended at least one in-service training session, with the average session attended by 62 percent of the possible attendees. The number of sessions and percent of attendance for teachers from each school is summarized in Table 1.

The in-service training program presented a different activity from the model physical education program each week. A copy of the model (see Appendix B) was disseminated to each participant during the first session. Folk dancing was introduced in the first week. Square dancing followed the next week. Low organization games and relays, physical fitness methods, testing, and activities, aerobic dance, basis skills and lead-up games for volleyball and soccer, and classroom activities were introduced in subsequent weeks. Gymnastics, tumbling, and basic skills and lead-up games for basketball, softball, and track and field were not incorporated in this in-service training. This researcher believed that time prohibited the inclusion of all facets of an elementary physical education program and proper and sufficient equipment was not available at any of the five in-service schools. This omission was not meant to suggest that these activities were not important.

Table 1

Number of Sessions and Percentage of Attendance for Each School

| <u>Name of School</u> | <u>Number of Sessions</u> | <u>Percent Attending</u>    |
|-----------------------|---------------------------|-----------------------------|
|                       |                           | <u>At Least One Session</u> |
| Oleai                 | 8                         | 100%                        |
| San Vicente           | 7                         | 93%                         |
| Kagman                | 6                         | 86%                         |
| Koblerville           | 6                         | 86%                         |
| Tanapag               | 5                         | 80%                         |

**Research Design Methodology**

This study involved six main phases:

- (a) the administration of a pre-test to all elementary school teachers in grades 1, 2, 3, 4, 5, and 6 on Saipan;
- (b) the random selection of four elementary schools that comprised the control group and five elementary schools that represented the experimental group;
- (c) the implementation of a model health-related, in-service, physical education training program to the experimental group over an eight-week period;
- (d) the administration of a post-test to all elementary school teachers in grades 1, 2, 3, 4, 5, and 6 on Saipan;
- (e) a second post-test, utilizing only the practice section, administered to the same teachers in both groups, 60 days after the last session; and
- (f) the analysis of the data.

### **Timeline**

Official permission from PSS to conduct the study was obtained in January 2001. The questionnaire was administrated in January to both the treatment and control groups as a pre-test. The in-service training physical education program was presented in February and March 2001. In April, after the in-service training was completed, the questionnaire was administrated to both groups as a post-test. In June, the practice section of the questionnaire, or second-post-test, was administrated to both groups. The timeline to display the various pre-test and post-tests is summarized in Table 2.

Table 2.

Timeline for pre-test, treatment, 1<sup>st</sup> post-test and 2<sup>nd</sup> post-test.

| Group     | Pre-test | In-service | 1 <sup>st</sup> Post-test | 2 <sup>nd</sup> Post-test |
|-----------|----------|------------|---------------------------|---------------------------|
| Treatment | Jan      | Feb-Mar    | April                     | June                      |
| Control   | Jan      |            | April                     | June                      |

### Choosing the Sample

The initial undertaking in addressing the research questions was to select the treatment and control groups. This researcher met with Saipan's education administration to enlist help in conducting this study, to ask permission to provide in-service physical education training (see Appendix C) and to select the elementary schools that would serve in the treatment and control groups. Saipan has ten elementary schools and nine agreed to participate in this study. Stratified random sampling, or purposive sampling, (Hinkle, Jue and Winkska, 1998) was used in selecting the schools that would make up the treatment and control groups. This is a method of selecting the sample populations in which certain characteristics are similar. All nine of the elementary schools' teacher populations are ethnically, economically, and socially similar. Five schools were placed in the treatment group and the remaining four schools in the control group. The treatment group's sample population was 96 first to sixth grade teachers and 77 first to sixth grade teachers were in the control group. A total of 173 elementary teachers participated in this study. The five schools that were designated to be in the treatment group were assigned a specific day of

the week for their in-service training session. These schools and their specific in-service days are summarized in Table 3.

Table 3.

In-Service Training Schedule

|                  |             |         |             |          |         |
|------------------|-------------|---------|-------------|----------|---------|
| Day of the week: | Monday      | Tuesday | Wednesday   | Thursday | Friday  |
| School:          | San Vicente | Oleai   | Koblerville | Kagman   | Tanapag |

### **Instrumentation - Questionnaire**

The data was gathered using a four-part questionnaire. The first part solicited demographic information. The second part included a series of 20 Likert-type questions asking participants about their attitudes toward teaching physical education. The participants answered each question with a response of 1 to 5. A higher score (5 or 4) indicates a more positive attitude. The responses to each statement were added together to get a total score for attitudes. The highest possible score was 100, and the lowest possible score was 20. The post-test score was subtracted from the pre-test score to obtain a change in attitude score. This change in attitude score for all participants was also used as a dependent variable in the multiple regression analysis of the data.

The third section of the questionnaire addressed the teachers' knowledge. The total possible score for each teacher on this part of the questionnaire was 40 since one point was awarded for the correct answer to each one of the 40 separate questions. To enable changes in knowledge to be reported for analysis, the knowledge score from the post-test was subtracted from the pre-test score to obtain a change in knowledge score. A change, either positive or negative, would indicate the number of correct questions as

having increased or decreased. This change in knowledge score was used as a dependent variable in the multiple regression analysis.

The fourth part of the questionnaire focused on the practices. This section also included 20 Likert-type questions, with a response of 1 to 5. A higher score (5 or 4) indicates how often positive practices are performed in a physical education class. The responses to each statement were added together to get a total score for each of the practice tests. The highest possible score was 100, and the lowest possible score was 20. Because the practice section of the questionnaire was administered three times, three change of practice scores were calculated. For post-01, the post-test-01 score was subtracted from the pre-test score to obtain a change in practice score. Practices-02 was calculated by subtracting the score of post-test-02 from the post-test-01. Post-test-03 score was subtracted from the pre-test score to obtain practices-03 change in score. These changes in practice scores for all participants were used as dependent variables in the multiple regression analysis.

#### Pre-test Procedures

The pre-test was administered at each elementary school independently. Teachers were informed of the procedures and purposes, and asked to sign a consent form (see Appendix D). The subjects were handed a copy of the test. Upon completion of the test, a code that was unique for each teacher was placed in the upper right-hand corner of the questionnaire. Teachers were allowed to leave the room at this point. No time limit was set for completing the questionnaire. Since all elementary schools on Saipan have virtually the

same social, economic and ethnic homogenous student population, the control and experimental groups were set-up randomly.

### Post-test Procedures

The first post-test was administered one school at a time in early April 2001. The process began with teachers being informed of the procedures and purposes, and then they were handed a copy of the test. Upon completion of the test, teachers were allowed to leave the room. No time limit was set for the test. In early June 2001, only Section IV, the practice section of the test, was distributed to teachers in both groups as the second post-test. This second post-test was performed eight weeks after the first post-test to measure any change in practices that may have occurred since in-service training was completed. These teachers once again checked the appropriate response to the 20 Likert type questions. The same procedures applied as before. One or two omitted questions were filled in with the average response of all those that answered the question. Three or more omitted questions caused the individual questionnaire to be invalid and was no longer used in the study. This correction procedure, called the zero-order procedure, produces unbiased and consistent parameter estimates in the regression analysis that follows.

### **Data Collection & Statistical Analysis**

Data analysis was accomplished in the following manner:

**Attitudinal:** All of the answers for the attitudinal part of the pre-test and post-test questionnaires were totaled. The total from the pre-test was subtracted from the post-test total for each respondent. The difference was labeled as the change in attitude. If a

respondent only answered eighteen of the twenty questions, the omitted questions average score for the entire sample was used as the response. As stated before, this is called the zero-order correction procedure. If a respondent failed to answer three or more questions, the individual test was eliminated from the study.

**Practices:** All of the answers for the practice section of the pre-test, post-test, and post-post-test questionnaires were totaled. This total from the pre-test was subtracted from the post-test total to derive the change in practices-01. If a respondent only answered eighteen of the twenty questions, the average scores for the entire sample were used in place of the missing responses. If a respondent failed to answer three or more questions, the individual test was eliminated from the study. This section was re-administered in early June 2001 as a post-post-test. Practices-01 is the change in practices from the pre-test subtracted from the first post-test. Practices-02 shows the change in practices from the first post-test to the second post-test, and the practices-03 scores shows the change in practices from the pre-test to the second post-test.

**Knowledge:** All of the answers for the knowledge part of the pre-test and post-test questionnaires were scored for accuracy. Each of the forty questions could only have one correct answer. All the correct answers were totaled to derive a score. The overall score for the pre-test and post-test were the number of correct answers. The score from the pre-test was subtracted from the post-test score. The difference was labeled as the change in knowledge score.

The changes in knowledge, attitudes, and practices were then analyzed to determine to what extent the demographic factors helped explain the changes. Multiple

regression analysis was used with the dependent variables serving as the change in attitudes, knowledge, and practices. The independent variables were the treatment and control groups, gender, grade level taught, length of teaching, grade-developmental level, and the number of times the individual exercises per week.

The general purpose of multiple regression analysis (MRA) was to learn more about the relationship between several independent or predictor variables and a dependent or criterion variable. In this study, a group or set of independent variables was used to predict or explain variation in the dependent variables. For example, this study attempted to determine how differences in number of exercise days per week, gender, grade level taught, and the years of teaching experience of the respondents affected the possible change in attitudes, knowledge, and practices towards teaching physical education by elementary physical education teachers on Saipan.

### **Validity and Reliability**

The selection of a survey instrument must address the issues of both internal and external validity. Validity refers to the extent to which an instrument measures what it is intended to measure. Reliability is defined as the extent to which a measuring device is consistent in measuring whatever it purports to measure (Backstrom & Hursh-Cesar, 1981).

Internal validity refers to the extent which the changes observed in a dependent variable are, in fact, caused by the independent variable(s) in a particular experimental situation (Backstrom & Hursh-Cesar, 1981). The survey instrument was reviewed for validation by a panel of four experts. These experts included university and college

professors and public school teachers who taught and were actively involved in research, or have had previous training in the area of teaching health-related physical education. Each expert reviewed the instrument for clarity and specificity. Items of concern were revised or eliminated based upon recommendations from this review.

External validity refers to the generalizability or representativeness of the findings (Backstrom & Hursh-Cesar, 1981). Repeated testing in an experimental design can restrict findings to only those populations who are subjected to repeated testing. Backstrom & Hursh-Cesar explained that as long as the measurements are of a typical, routine type used in school situations, this was not likely to be a serious limitation. Since attitudes and knowledge are a regular evaluative measure, repeated testing was not seen to be a limitation of this study.

Reliability was determined by administering the survey instrument to a sample of eight public junior and senior high school teachers drawn from those who teach physical education on a daily basis. These subjects were selected randomly. The Cronbach Alpha, which measures the strength of the association between individual questions and the overall construct, was used with Section B, the attitude section, (strongly agree (5), agree (4), neutral (3), disagree (2), strongly disagree (1)) and Section D, the section on practices, I do all the time (5), I do most of the time (4), I do sometimes (3), I almost never do (2), I never do (1). A Likert type scale was employed in both sections. A split-half procedure was used to measure reliability in Section C (knowledge) where the test was divided according to odd and even numbered test items. The Pearson-product correlation coefficient for the odd and even questions indicated the level of reliability. This

coefficient measured the relationship between the odd and even questions. Utilizing these two procedures determined the internal consistency. An average score of 75 per cent correct was obtained from the eight individuals who took the test by using the split-half technique. The Spearman-Brown Prophecy formula was used to calculate the correlation between the halves, and found the correlation to be .86. The reliability of the complete test is estimated to be greater than half of it ( $.86 > .75$ ). The reliability rating of .86 is between High and Excellent on a reliability rating by Kirkendall, Gruber, & Johnson (1987). Thus, the reliability of the questionnaire is well above the limits that have been established.

### **Analysis of Data**

Data was analyzed using multiple regression analysis. This method was selected because of the numerical features of the data, and the need to look for relationships between the change of scores for knowledge, practices, attitudes and total score and for the associated demographic factors. Regression equations were estimated using the four change of scores, independently of each other, as the dependent variables, and all or various combinations of the independent variables: in-service group, grade level taught, gender, number of years teaching experience, and number of exercise days per week. The best fitting model was found by the strength and depth of the r-squared value for the set of the regression model. An in depth analysis of data is given in Chapter 4.

### **Limitations of the Study**

Limitations of the proposed research include the reality that this researcher was not an employee of the Public School System, only an individual permitted to provide an in-

service physical education training program. Though permission was granted to the researcher, the impact of the in-service program might have been greater if the researcher had been an employee of PSS.

A second limitation of the study is that some may see the writer's personal bias as a limitation of the study. It is the belief of this researcher that it is a privilege and responsibility as a teacher to pass on pertinent information that will enhance the well being of our children for the future years. This researcher believes that the need to do so is urgent due to the rise in chronic and kinetic type diseases in the CNMI. Whether the researcher's bias does or does not limit the value of the research is left up to the reader to decide. As Dunn (1986) gracefully argued, there is no such thing as a neutral spectator. The study was experimental in nature and was not asking whether physical education programs are important. Using quantitative measures for gathering data, the research study focused on the question of whether there was a statistically significant difference between changes of knowledge, practices, and attitude scores after attending a model in-service physical education training program.

### **Ethical Considerations**

The established procedures of the University of San Diego's Committee for the Protection of Human Subjects were followed before and during this research study. Participation in this study was voluntary; there was no expense and minimal risks to the participants. All state or territory and federal regulations were adhered to, to ensure confidentiality and agreement to regulations governing such studies. Approvals were employed and every effort was made to utilize and/or report results in a non-identifying

manner. Participants' confidentiality included all schools, professionals, and others involved.

### **Summary**

The researcher was in an excellent position to implement a physical education training model to a large sample population and investigate the potential impact using base-line data compared with the results of a post-test. A quasi-experimental, two-group time series design was used in order to investigate the change in attitudes, knowledge, and practices of elementary school teachers when introduced to a model physical education in-service training program. The research design was such that individual identities of teachers were protected. A second investigation probed the effect that select independent variables had on the change of attitudes, knowledge, and practices with the same group of teachers. The study was intended to result in the identification of a method that might help address the need for better quality physical education programs on Saipan. This study was therefore, not an end to the investigation of a means to achieve excellent programs for students, but a necessary first step.

## **CHAPTER FOUR**

### **RESULTS and ANALYSIS of DATA**

#### **Introduction**

This chapter begins with a summary of the purpose of the study and then discusses the study design. The chapter also provides descriptive analysis of the collected data and concludes by presenting the results and analyses of the multiple regression models.

The purpose of this study is to evaluate the effect of an eight-week, in-service training program on teachers' attitudes, knowledge, and practices toward the teaching of physical education. The in-service program was based on a model physical education program designed by this researcher. A review of the literature regarding the importance of physical education showed physical education programs to be a dynamic means of acquiring healthy fitness habits at a young age that can last a lifetime. As more and more elementary school districts are placing the responsibility of physical education instruction with the classroom teacher (Salas, 1998), it may be pertinent to evaluate their level of knowledge, attitudes, and practices toward their teaching of physical education. Elementary teacher's knowledge, attitudes, and practices were shown in the literature review to be a fundamental and primary ingredient in the presentation of a viable and useful instructional program. Given what is known about the correlation of physical education and positive life-style habits, and the sweeping health problems in the CNMI associated with the lack of exercise, it seemed logical to study whether, in this setting, a

statistically significant change in knowledge, attitudes, and practices could result from the intervention.

### **Design of the Study**

Two research questions drove the investigation. The first asked, “Does exposure to a model health-related physical education program influence or affect a change in the attitudes, knowledge, and practices of Saipan elementary school teachers?” Part of the task in answering this question was to identify, by way of literature review, a model physical education program that could be used in an in-service training program. Through this comprehensive literature review, it was deemed necessary that even though there were a number of outstanding and viable model physical education programs, one would have to be created that addressed the needs and culture of people in the CNMI. A number of existing models were used to help develop a curriculum that could be used in the in-service training program for this research. A second research question asked, “Do demographic variables, such as gender, grade level taught, number of years teaching, and number of times an individual exercises per week, cause a significant difference in attitudes, knowledge, and practices in elementary classroom teachers on Saipan teaching physical education?” In answering the research questions the task was to identify, by way of literature review, a tool that could be utilized in collecting needed data on the three variables of knowledge, attitudes, and practices in an elementary school setting. By way of the thorough literature review, it was determined that no such tool existed. More amazingly, no appropriate assessment tool could be located that has evaluated elementary school teachers’ knowledge and practices. Only one study done on elementary classroom

teachers' attitudes toward the teaching of physical education was discovered.

Consequently, it was then decided that an instrument to collect the desirable data needed to be created and developed.

The research questions and investigation of available literature associated with elementary teachers' knowledge, attitudes, and practices led to the following five null hypotheses.

1. Exposure to a model health-related physical education program will not influence or effect a change in knowledge for elementary classroom teachers on Saipan teaching physical education.
2. Exposure to a model health-related physical education program will not influence or effect a change in attitudes for elementary classroom teachers on Saipan teaching physical education.
3. Exposure to a model health-related physical education program will not influence or effect a change in practices for elementary classroom teachers on Saipan teaching physical education.
4. Exposure to a model health-related physical education program will not influence or effect a change for the total score for elementary classroom teachers on Saipan teaching physical education.
5. Individually, the independent variables (gender, number of years taught, grade level taught and number of exercise days per week) will have no effect on the attitudes, knowledge, and practices of elementary classroom teachers on Saipan teaching physical education

With numerical data available and determining the extent of relationships among variables as an objective, multiple regression analysis was chosen as the suitable analytical tool to aid in the investigation. The plan for data analysis included calculating a change in scores for knowledge, practices, and attitudes by subtracting the post-test scores for each respondent from their respective pre-test scores. Then, using change in scores for the dependent variables of knowledge, attitudes, and practices, determine relationships from the final multiple regression models. Adding the changes of knowledge, attitude, and practice scores together produced a fourth dependent variable, the change in total score.

The questionnaire, to gather data about teachers' knowledge, attitudes, and practices toward teaching of physical education, was administered as a pre-test and eight weeks later as a post-test to all elementary school teachers on Saipan. This questionnaire (see Appendix A) was designed and created as none existed in order to measure knowledge, practices, and attitudes of elementary classroom teachers who teach their own physical education.

All pre-test, post-test, and post-post-test scores were recorded along with data indicating gender, treatment or control group placement, number of exercise days per week, years of teaching experience, and grade level taught. A regression model was used to look for relationships between these five independent variables and possible changes in scores for the dependent variables of knowledge, attitudes, and practices and in the total score.

### **Demographic Comparison**

In this section, descriptive statistics are reported for the demographic variables used in the sample. As shown in Table 4, the treatment group was made up of 77 female and 19 male elementary classroom teachers. Among these teachers, their experience ranged from first year teachers to those teachers with more than 30 years of teaching experience. However, teachers with between 6 and 10 years of experience were the most common. In regards to the number of days exercised per week, the participants who exercised three times a week were the most populous group. In addition, in terms of grade levels represented, second grade teachers were the most often represented in the sample.

In the control group, 58 of the teachers were female and 19 were male. Teaching experience in this group also had a wide and diverse range, but as with the treatment group, the most often represented group in the sample were teachers with between 6 and 10 years of experience. Just as with the treatment group, teachers who exercised three times a week were the most often represented in the sample. However, unlike the treatment group, the most common grade level was fourth grade teachers.

Data from the demographic statistics, together with the intuitive insight provided by the Public School System district personnel, gave the researcher confidence that the two groups were similar enough in nature to continue with the study.

Table 4

## Descriptive Statistics for the Demographic Variables Used in the Study

| Variable Level                          | Treatment Group |         | Control Group |         |
|---|-----------------|---------|---------------|---------|
|   | Number          | Percent | Number        | Percent |
| <b>Gender</b>                           |                 |         |               |         |
| Male                                    | 19              | 20.8    | 20            | 26.0    |
| Female                                  | 77              | 80.2    | 57            | 74.0    |
| <b>Years Teaching Experience</b>        |                 |         |               |         |
| 1 <sup>st</sup> Year                    | 19              | 19.8    | 9             | 11.7    |
| 2 <sup>nd</sup> Year                    | 19              | 19.8    | 7             | 9.1     |
| 3 to 5 Years                            | 12              | 12.5    | 16            | 20.8    |
| 6 to 10 Years                           | 22              | 22.9    | 18            | 23.3    |
| 11 to 20 Years                          | 18              | 18.7    | 16            | 20.8    |
| 21 to 30 Years                          | 4               | 4.2     | 9             | 11.7    |
| 31+ Years                               | 2               | 2.1     | 2             | 2.6     |
| <b>Number of Exercise Days Per Week</b> |                 |         |               |         |
| 1 Day Per Week                          | 17              | 17.7    | 9             | 11.7    |
| 2 Days Per Week                         | 16              | 16.6    | 8             | 10.4    |
| 3 Days Per Week                         | 21              | 21.9    | 26            | 33.7    |
| 4 Days Per Week                         | 12              | 12.5    | 6             | 7.8     |
| 5+ Days Per Week                        | 18              | 18.8    | 17            | 22.1    |
| Do Not Exercise                         | 12              | 12.5    | 11            | 14.3    |
| <b>Grade Level</b>                      |                 |         |               |         |
| 1 <sup>st</sup> Grade                   | 18              | 18.8    | 14            | 18.2    |
| 2 <sup>nd</sup> Grade                   | 21              | 21.9    | 11            | 14.3    |
| 3 <sup>rd</sup> Grade                   | 13              | 13.5    | 11            | 14.3    |
| 4 <sup>th</sup> Grade                   | 15              | 15.6    | 15            | 19.4    |
| 5 <sup>th</sup> Grade                   | 16              | 16.7    | 12            | 15.6    |
| 6 <sup>th</sup> Grade                   | 13              | 13.5    | 14            | 18.2    |

### **Calculating Values for the Variables**

The total possible score for each teacher on the knowledge part of the questionnaire was 40 - the total number of questions. To enable changes in knowledge to be reported for analysis, the knowledge score from the pre-test was subtracted from the post-test score to obtain a change in knowledge score. A change, either positive or negative, would indicate that the number of correctly answered questions had increased or decreased. This change in knowledge score was used as a dependent variable in the multiple regression analysis.

The attitude section of the questionnaire was 20 Likert-type statements, with a response of 1 to 5. A higher score (5 or 4) indicates a more positive attitude. The responses to each statement were added together to get a total score for attitudes. The highest possible score was 100, and the lowest possible score was 20. The post-test score was subtracted from the pre-test score to obtain a change in attitude score. This change in attitude score for all participants was also used as a dependent variable in the multiple regression analysis of the data.

The practice section of the questionnaire also included 20 Likert-type questions, with a response of 1 to 5. A higher score (5 or 4) indicates how often positive practices are performed in a physical education class. The responses to each statement were added together to get a total score for each of the practice tests. The highest possible score was 100, and the lowest possible score was 20. Because the practice section of the questionnaire was administered three times, three changes of practice scores were

calculated. For practice-01, the pre-test score was subtracted from the post-test-01 score to obtain this change in practice score. Practice-02 was calculated by subtracting the score of post-test-01 from the post-test-02 score. Practice-03 was calculated by subtracting the score of the pre-test from the post-test-02 score. These three changes in practice scores were used as dependent variables in the initial model-building stage of the multiple regression analysis. However, the final regression models only used the practice-03 change in score (see Table 9 discussion). Means, standard deviations, and average responses for the knowledge, attitude, and practice sections of the questionnaire are displayed in Tables 5, 6, 7, and 8.

Lastly, numbers were assigned to the dummy variables for gender so that they could be used in the regression equations. Males were assigned 0, and females, 1. Teachers in the treatment group were assigned the number 1, and the control group participants were assigned the number 0.

### **Questionnaire Response Analysis**

#### Attitudes

The attitude pre-test average score for the treatment group's responses on the 20-Likert-type questions was 68.4, or an average response for each individual statement of 3.4. The post-test average score for the treatment group was 69.6 or an increase of 1.2 points. The control groups' average score was 67.0 for the pre-test and 67.1 for the post-test, for an increase of .1. The attitude section shows a minor change in attitudes, whether in the treatment or control group. Attitude scores are presented in Table 5.

Table 5

Averages of Attitude Scores

| Test             | Treatment Group |      |        | Control Group |      |        |
|------------------|-----------------|------|--------|---------------|------|--------|
|                  | Pre             | Post | Change | Pre           | Post | Change |
| Mean             | 68.4            | 69.6 | 1.2    | 67.0          | 67.1 | .1     |
| Std Dev          | 6.9             | 7.0  | .1     | 6.3           | 5.9  | -.4    |
| Average Response | 3.4             | 3.5  | .1     | 3.4           | 3.4  | .0     |

It is apparent from the scores of the attitude questionnaire that the treatment group's change in score is slightly greater than that of the control group. This change may be attributed to the fact that the in-service training program produced this positive effect. See Appendix E for results from the attitude section of the questionnaire.

Practices

The practices of elementary teachers were tested three times: a pre-test, a post-test administered eight weeks after the pre-test, and also by a second post-test, which was administered sixteen weeks after the pre-test. The following discussion of scores is examined with three sets of post-test results. The first measure is the change in practices from the pre-test to the first post-test. The second measure shows the change in practices from the first post-test to the second post-test, and the third measure describes the change in practices from the pre-test to the second post-test. These results are labeled practice-01, practice-02, and practice-03, respectively.

Table 6

**Averages of Practice-01 Scores (Pre-test in relationship to Post-test-01)**

| Test             | Treatment Group |      |        | Control Group |      |        |
|------------------|-----------------|------|--------|---------------|------|--------|
|                  | Pre             | P-01 | Change | Pre           | P-01 | Change |
| Mean             | 66.3            | 69.7 | 3.4    | 63.4          | 60.8 | -2.6   |
| Std Dev          | 17.7            | 17.4 | -.3    | 21.7          | 23.8 | 2.1    |
| Average Response | 3.3             | 3.5  | .2     | 3.2           | 3.0  | -.2    |

Practice-01 scores, displayed in Table 6, show the treatment group with a pre-test average score of 66.3 and a post-test-01 average score of 69.7, representing a gain of 3.4 points. However, the control group's results were noticeably different. Their pre-test average score was 63.4 with an even lower score of 60.8 for the post-test-01, yielding a loss of 2.6 points. The change in practice scores, therefore, shows only a slight increase for the teachers in the treatment group practices.

The second post-test was administered sixteen weeks after the pre-test. Results for practice-02 are displayed in Table 7. The control group's second post-test average score was 63.9 with an increase of 3.1 from the post-test-01 score of 60.8. The treatment group's first post-test was a rather high score of 69.7 and when compared to the post-test-02 of 70.1 showed an increase of only 0.4. Little if any change took place in practices for the treatment group while the control group, with no in-service training, showed a modest increase.

Table 7

| <u>Averages of Practice-02 Scores (Post-test-01 in relationship to Post-test-02)</u> |                 |      |        |               |      |        |
|--|-----------------|------|--------|---------------|------|--------|
|  | Treatment Group |      |        | Control Group |      |        |
| Level  | P-01            | P-02 | Change | P-01          | P-02 | Change |
| Mean   | 69.7            | 70.1 | .4     | 60.8          | 63.9 | 3.1    |
| Std Dev  | 17.7            | 17.4 | -.3    | 21.8          | 25.4 | 3.6    |
| Average Response   | 3.5             | 3.5  | .0     | 3.0           | 3.2  | .2     |

The third post-test change in scores was calculated by subtracting the pre-test score from the post-test-2 score. The results are displayed in Table 8. The control group's second post-test score was 63.9 and was an increase of 0.5 from the pre-test score of 63.4. The treatment post-test-02 was a rather high score of 70.1 and when compared to the pre-test score of 66.3 shows an increase of 3.8. Little if any change took place in practices for the control group while the treatment group, with in-service training, showed a modest increase.

Table 8

| <u>Averages of Practice-03 Scores (Pre-test relationship to Post-test-02)</u> |                 |      |        |               |      |        |
|---|-----------------|------|--------|---------------|------|--------|
| Test  | Treatment Group |      |        | Control Group |      |        |
| Level   | Pre             | P-02 | Change | Pre           | P-02 | Change |
| Mean  | 66.3            | 70.1 | 3.8    | 63.4          | 63.9 | .5     |
| Std Dev   | 17.7            | 17.7 | .0     | 21.8          | 25.4 | 3.6    |
| Average Response  | 3.3             | 3.5  | .2     | 3.8           | 3.0  | -.8    |

It should be noted that only the post-03 change in score will be used in the following multiple regression analysis section. This researcher has determined that the post-02 and post-03 scores are statistically similar enough to allow the use of only one practice change of score. As mentioned above, subtracting the post-02 score for each respondent from their respective pre-test score yields the practice-03 change of score. The use of only one change of practice measure did not distort, one way or the other, the change of the total score. An unbiased total change score for each participant was calculated by using their changes in knowledge and attitude score and only one change in practice score.

To justify the use of only the post-test-03 (pre-post-02) change of score for the purposes of data analysis, a comparison of the mean change of scores for practice-01 and practice-03 was performed. A One-Sample T-test was constructed to compare the two means. As is illustrated in Table 9, the two measures are statically similar, with practice-03 having the slightly stronger mean. Consequently, practice-03 will be used as the change of practice score in all further analysis and discussion.

Table 9

T-test for Practice-01 and Practice-03 Scores

| <u>Measure</u> | <u>Mean</u> | <u>Std. Deviation</u> | <u>Std. Error<br/>Mean</u> |
|----------------|-------------|-----------------------|----------------------------|
| Practice-01    | 2.36        | 17.68                 | 1.34                       |
| Practice-03    | 2.46        | 21.67                 | 1.65                       |

See Appendix F for results from the practice section of the questionnaire.

## Knowledge

The knowledge section of the questionnaire proved to be the most interesting in terms of the change in pre- and post-tests scores. As shown in table 10, the treatment group averaged only 22.0 correct on the pre-test, somewhat lower than the control group's average of 24.4 correct or a difference of 2.4 questions. However, the post-test produced significantly different results. The treatment group recorded an average of 28.3 correct while the control group returned an average score of 23.8. The post-test difference between the treatment and control group produced a 4.5 difference in favor of the treatment group. The treatment group's increase in the pre-test to post-test scores was an approximate gain of 25 percent or a 6.3 gain in correct answers. The control group produced a negative change on their knowledge test score with a difference of -.6.

Table 10

| <u>Averages of Knowledge Scores (Pre-test in relationship to Post-test)</u> |                 |      |        |               |      |        |
|---|-----------------|------|--------|---------------|------|--------|
| Test  | Treatment Group |      |        | Control Group |      |        |
| Level   | Pre             | Post | Change | Pre           | Post | Change |
| Mean  | 22.0            | 28.3 | 6.3    | 24.4          | 23.8 | -.6    |
| Std Dev   | 6.0             | 6.3  | .3     | 5.0           | 5.2  | .2     |

See Appendix G for results from the knowledge section of the questionnaire.

## **Multiple Regression Analysis**

### Initial Model

Several regression models were applied to the data as part of the analysis design. The dependent variables -- change in knowledge score, change in attitude score, change in practice score, and change in the total score -- were regressed against the same set of

independent variables (in-service group, gender, number of years teaching experience, grade level presently teaching, and number of exercise days per week) to determine the extent to which each of the independent variables significantly explained variation within the four dependent variables. This chapter provides an overview of the most significant results from the regression models.

To provide the reader with an overview of all four-regression models, Table 11 presents the goodness-of-fit statistics,  $R^2$ , adjusted  $R^2$ , as well as the standard error of the estimate, and the significance level. As Table 12 illustrates, the change in knowledge score illustrates a significant  $R^2$  of .000 indicating that the independent variables as a group explained a very significant 28 per cent of the variation in the change of knowledge scores. Of note, however, is that 72 per cent of the variation is attributable to other factors. This is not surprising since, as was pointed out in the literature review, the attitudes of school principals and other educational administrators toward physical education as well as the teachers' educational and cultural background were identified as exerting compelling influences on knowledge, practices, and attitudes.

The other three dependent variables were not affected by the independent variables with the same strong statistical significance as the change in knowledge score was. For example, although the  $R^2$  for the attitude model was a significant .12, the models for practices and total scores had insignificant  $R^2$ s of .04 and .11.

Table 11

Initial Model Multiple Regression Summary Table for R, Adjusted R<sup>2</sup>, R2 and Standard Error of the Estimate.

| Dependent Variable    | R <sup>2</sup> | Adjusted R <sup>2</sup> | Std. Error of the Estimate | Significant Level |
|-----------------------|----------------|-------------------------|----------------------------|-------------------|
| Change in scores for: |                |                         |                            |                   |
| Knowledge             | .28            | .22                     | 4.84                       | .00               |
| Attitudes             | .12            | .05                     | 6.67                       | .07               |
| Practices             | .04            | -.04                    | 22.13                      | .95               |
| Total Score           | .11            | .04                     | 23.30                      | .13               |

The initial multiple regression models, displayed in tables 12, 13, 14, and 15, do not list all of the independent variables, since the use of dummy variables requires the deletion of a variable to avoid perfect collinearity. The omitted variables, or reference variables, are grade-01 and six to ten years teaching experience. Each of the grade level regression coefficients (independent variables) are compared with the omitted variable, grade-01, while the years teaching experience coefficient is compared with the omitted variable of six to ten years of teaching experience.

Table 12 presents the estimated coefficients, their t-statistics, and the level of significance from the same initial change of knowledge model, indicating the degree to which each independent variable explains the change in knowledge score. Table 13 also illustrates that the in-service group is the only statistically significant variable in the regression, although it is significant at the 1% level. The estimated coefficient for this

variable, 5.56, indicates that in this particular model, a change in the knowledge score produces an average increase of 5.6 questions for those who participated in the in-service training program. For example, if each of the other variables remained constant, a change from the control group to the treatment group would have resulted in an average of a 5.6 question increase for each participant in the treatment group.

Table 12

**Initial Model Multiple Regression Summary Table for Estimated Coefficient, t-statistic, and Level of Significance for the Dependent Variable: Change in Knowledge Score.**

| <u>Independent Variable:</u> | <u>Estimated Coefficient</u> | <u>t-statistic</u> | <u>Level of Significance</u> |
|------------------------------|------------------------------|--------------------|------------------------------|
| Exercise Days                | -1.23                        | -0.06              | .49                          |
| Gender                       | .89                          | .96                | .36                          |
| In-service Group             | 5.56                         | 7.25 ***           | .00                          |
| Grade-02                     | .12                          | .10                | .92                          |
| Grade-03                     | .26                          | .19                | .85                          |
| Grade-04                     | -4.83                        | .04                | .97                          |
| Grade-05                     | .30                          | .23                | .82                          |
| Grade-06                     | -.77                         | -.58               | .56                          |
| 1 & 2 Years Teach Ex         | -6.68                        | .01                | .99                          |
| 3 to 5 Years Teach Ex        | -2.01                        | -.03               | .98                          |
| 11 to 20 Years Teach Ex      | -.39                         | -1.01              | .31                          |
| 21 to 30 Years Teach Ex      | -1.30                        | -.89               | .37                          |
| 31+ Years Teach Ex           | 3.22                         | 1.27               | .21                          |

\*\*\* = significant at the 1% level

Also of interest in this model is the lack of significance for grade level taught, number of teaching years, gender, and the number of exercise days per week. The model shows that in the sample population these independent variables had no statistically significant effect on the change in knowledge score.

Table 13 presents the estimated coefficients, t-statistics, and levels of significance, indicating the degree to which each independent variable contributes to the change in attitude score. This model clearly indicates that the independent variables individually have no effect on the measure of change in attitude at the 1% or 5% level of confidence. However, the number of exercise days, second and fifth grade teachers, and first and second year teachers, were significant at the 10% level in explaining the change of attitudes. The model shows that in the sample population, first and second year teachers slightly improved their attitude scores on the average of 1.47 points more than teachers with more teaching experience. An explain for this increase by teachers with minimal teaching experience may be that they have more enthusiasm and motivation in learning new knowledge concerning subjects that they must teach in their self-contained classroom. This model also shows that a participant's change of attitude score is decreased by about a half a point (-0.55) for each additional day that an individual exercises per week. In addition, first grade teachers (omitted variable) gained significantly more in their change of attitude scores when compared to those of second and fifth grade teachers. For example, first grade teachers increased their attitude scores by 4.6 points (-4.62) more than second grade teachers and 3.4 (-3.38) points more than fifth grade teachers.

Table 13

**Initial Model Multiple Regression Summary Table for Estimated Coefficient, t-statistic, and Level of Significance for the Dependent Variable: Change in Attitude Score.**

| <b>Independent Variable:</b> | <b>Estimated Coefficient</b> | <b>t-statistic</b> | <b>Level of Significance</b> |
|------------------------------|------------------------------|--------------------|------------------------------|
| In-service Group             | 1.73                         | 1.64               | .10                          |
| Gender                       | -.48                         | -.36               | .72                          |
| Exercise Days                | -.55                         | -1.97 *            | .05                          |
| Grade-02                     | -4.62                        | -2.71 *            | .01                          |
| Grade-03                     | -2.01                        | -1.08              | .28                          |
| Grade-04                     | -1.57                        | -.88               | .38                          |
| Grade-05                     | -3.38                        | -1.82 *            | .07                          |
| Grade-06                     | - 7.25                       | .04                | .97                          |
| 1 and 2 Years Teach Ex       | 1.47                         | 1.78 *             | .08                          |
| 3 to 5 Years Teach Ex        | -1.07                        | -1.07              | .28                          |
| 11 to 20 Years Teach Ex      | .10                          | .20                | .85                          |
| 21 to 30 Years Teach Ex      | 1.82                         | .91                | .37                          |
| 31+ Years Teach Ex           | 1.73                         | .51                | .61                          |

\* = significant at the 10% level

Similarly, Table 14 also presents the estimated coefficients, t-statistics, and levels of significance for the change in practices regression model. Consistent with the low  $R^2$ , this model produced only one significant variable – third grade teachers – and it was only significant at the 10% level. Since the regression coefficient was  $-10.5$ , this suggests that

first grade teachers increased their practice scores by 10.5 points more than third grade teachers.

Table 14

Initial Model Multiple Regression Summary Table for Estimated Coefficient, t-statistic, and Level of Significance for the Dependent Variable: Change in Practice Score.

| <u>Independent Variable:</u> | <u>Estimated Coefficient</u> | <u>t-statistic</u> | <u>Level of Significance</u> |
|------------------------------|------------------------------|--------------------|------------------------------|
| In-service Group             | 1.64                         | .47                | .64                          |
| Gender                       | -.73                         | -.17               | .87                          |
| Exercise Days                | -.98                         | -1.06              | .29                          |
| Grade-02                     | -7.4                         | -1.312             | .19                          |
| Grade-03                     | -10.48                       | -1.70 *            | .09                          |
| Grade-04                     | -7.62                        | -1.29              | .20                          |
| Grade-05                     | -7.84                        | -1.27              | .21                          |
| Grade-06                     | -5.73                        | -.95               | .34                          |
| 1 and 2 Years Teach Ex       | 1.86                         | .68                | .50                          |
| 3 to 5 Years Teach Ex        | -2.52                        | -.76               | .45                          |
| 11 to 20 Years Teach Ex      | -7.25                        | .04                | .97                          |
| 21 to 30 Years Teach Ex      | -.33                         | -.05               | .50                          |
| 31+ Years Teach Ex           | 10.24                        | .88                | .38                          |

\* = significant at the 10% level

Table 15 presents the estimated coefficients, t-statistics, and levels of significance from the change in total score regression model. Examination of this table shows the in-service group variables to be highly significant at the 1% level, while grade 3, grade 5 and teachers with one to two years of experience were significant at the 10% level. The estimated coefficient of the in-service group, 11.89, indicates that in this particular model, teachers who participated in the in-service training program gained almost 12 questions/points more than those in the control group did.

In addition, teachers with one or two years of teaching experience who participated in the in-service training program gained an average of almost 5 points more than teachers with 6 to 10 years of teaching experience. Furthermore, first grade teachers gained 12.24 points more than third grade teachers and 12.52 points more than fifth grade teachers.

Table 15

**Initial Model Multiple Regression Summary Table for Estimated Coefficient, t-statistic, and Level of Significance for the Dependent Variable: Change in Total Score.**

| Independent Variable:   | Estimated Coefficient | t-statistic | Level of Significance |
|-------------------------|-----------------------|-------------|-----------------------|
| In-service Group        | 11.89                 | 3.23 ***    | .00                   |
| Gender                  | -6.00                 | -1.28       | .20                   |
| Exercise Days           | .72                   | .75         | .46                   |
| Grade-02                | -8.19                 | -1.37       | .17                   |
| Grade-03                | -12.24                | -1.89 *     | .06                   |
| Grade-04                | -9.85                 | -1.58       | .12                   |
| Grade-05                | -12.52                | -1.93 *     | .06                   |
| Grade-06                | -5.48                 | -.87        | .39                   |
| 1 and 2 Years Teach Ex  | 4.86                  | 1.69 *      | .09                   |
| 3 to 5 Years Teach Ex   | -4.48                 | -1.29       | .20                   |
| 11 to 20 Years Teach Ex | -.51                  | -.28        | .78                   |
| 21 to 30 Years Teach Ex | -.65                  | -.09        | .93                   |
| 31+ Years Teach Ex      | 12.40                 | 1.02        | .31                   |

\*\*\* = significant at the 1% level

\* = significant at the 10% level

#### The Final Model

Other regression models were created and run by using different combinations of dependent and independent variables. However, in all of these supplemental models, a significant statistical effect on the increase in the change of knowledge score was produced

by the in-service group, and always at the 1 per cent level of confidence. The other independent variables continued to denote no statistical significance at the 1% and 5% level of confidence.

The regression model that was finally accepted is illustrated in Tables 16-20. This model was created with one major change. Since the in-service variable was significant in the initial model, this researcher decided to see if a variation of the in-service variable could produce a greater effect on any of the dependent variables. The purpose of creating this change was to evaluate the effect that each training session may have had on the change of scores for knowledge, attitudes, practices, and the total scores. The in-service dependent variable was replaced by a new variable labeled number of in-service sessions attended. The evidence from the review of literature supported the plan to use the number of each participant's sessions attended as an independent variable.

The number of in-service training sessions varied among the participants in the treatment group. This variable was created by using the number of sessions attended by each participant in the treatment group, which ranged from zero to eight sessions. Some participants in the treatment group did not attend any sessions. The control group participants received a zero, as they did not attend any sessions.

As with the initial regression models, these supplemental regression models (displayed in tables 17, 18, 19, and 20) also have two independent variables that were omitted, since the use of dummy variables requires the deletion of a variable to avoid perfect collinearity. Each regression coefficient for grade levels taught is a comparison between the four dependent variables, individually, and to the referenced (omitted)

category of grade-01, while the regression coefficient for the number of teaching experience years is compared with the reference variable of teachers with one to two years of teaching experience.

Table 16

**Final Model Multiple Regression Summary Table for R, Adjusted R<sup>2</sup>, R<sup>2</sup> and Standard Error of the Estimate.**

| Dependent Variable    | R <sup>2</sup> | Adjusted R <sup>2</sup> | Std. Error of the Estimate | Significant Level |
|-----------------------|----------------|-------------------------|----------------------------|-------------------|
| Change in scores for: |                |                         |                            |                   |
| Knowledge             | .33            | .27                     | 4.69                       | .00               |
| Attitudes             | .11            | .04                     | 6.70                       | .11               |
| Practices             | .04            | -.04                    | 22.14                      | .95               |
| Total Score           | .11            | .03                     | 23.34                      | .15               |

Table 16 presents the goodness-of-fit statistics, R<sup>2</sup>, adjusted R<sup>2</sup>, as well as the standard error of the estimate, and the significance level. As Table 16 shows, the change in knowledge score illustrates a significant R<sup>2</sup> of .00 indicating that the independent variables as a group explained almost 33 per cent of the variation in the change of knowledge scores, a significant improvement over the original modeling specification. Of course, sixty-six per cent of the variation is still attributable to other factors. However, in terms of variation in the change of attitudes, practices, and total score, the independent variables could only explain 11 percent, 4 percent, and 11 percent respectively.

As shown in Table 17, the variable number of sessions was employed in the regression equation that measured the change in knowledge score. Other variables in the

model were gender, grade level taught, number of years taught, and the number of exercise days per week. Utilizing the number of sessions attended produced the same level of significance (.00) in the change of knowledge score as the initial model that used in-service training.

Table 17

Final Model Multiple Regression Summary Table for Estimated Coefficient, t-statistic, and Level of Significance for the Dependent Variable: Change in Knowledge Score.

| <u>Independent Variable:</u> | <u>Estimated Coefficient</u> | <u>t-statistic</u> | <u>Level of Significance</u> |
|------------------------------|------------------------------|--------------------|------------------------------|
| Num of Sessions              | 1.07                         | 8.20 ***           | .00                          |
| Gender                       | .39                          | .41                | .68                          |
| Exercise Days                | -4.09                        | -.21               | .83                          |
| Grade-02                     | -3.96                        | .00                | 1.00                         |
| Grade-03                     | -.17                         | -.13               | .90                          |
| Grade-04                     | .23                          | .18                | .86                          |
| Grade-05                     | .48                          | .37                | .72                          |
| Grade-06                     | -.24                         | -.19               | .85                          |
| 3-5 Years Teaching Ex        | -5.85                        | -.16               | .88                          |
| 6-10 Years Teaching Ex       | .17                          | .28                | .78                          |
| 11-20 Years Teaching Ex      | -.16                         | -.26               | .79                          |
| 21-30 Years Teaching Ex      | -.54                         | -.38               | .70                          |
| <u>31+ Teaching Years Ex</u> | <u>2.70</u>                  | <u>1.11</u>        | <u>.27</u>                   |

\*\*\* = significant at the 1% level

This table also shows that the number of in-service training sessions attended is the only statistically significant variable in the model, albeit at the 1 per cent level of significance. Using the number of in-service training sessions attended produced a more refined estimated coefficient, 1.07, than simply measuring whether someone had been assigned to the in-service training program, whose estimated coefficient was 5.6. As such, for each training session attended, scores increased by a little more than a point (1.07), suggesting that, for example, a teacher that attended six sessions would score 6.42 points higher than teachers would in the control group.

Table 18 illustrates that the number of sessions attended does not have the same influence on the change in attitude score as it did on the change in knowledge score. None of the independent variables had a statistically significant effect on the change in attitude score at the 1% or 5% level of acceptability; however, five independent variables were statistically significant at the 10% level of confidence. Second grade teachers, with an estimated coefficient of  $-4.59$ , scored an average of 4.6 points less than first grade teachers. Fifth grade teachers also scored significantly lower, specifically 3.6 points lower than teachers from the first grade. Exercise days per week also produced a significant change of minus  $-.54$  point. The interpretation is that for every additional day of exercise per week, the attitudes of the participants' change of score decreased by a half a point. Teachers who had between six and ten as well as eleven to twenty years of teaching experience also improved their attitude toward the teaching of physical education. Teachers with six to ten years of experience produced a 1.39-point average gain, and

teachers with eleven to twenty years teaching experience had a 1.51-point average increase as compared to teachers with only one or two years of teaching experience.

Table 18

Final Model Multiple Regression Summary Table for Estimated Coefficient, t-statistic, and Level of Significance for the Dependent Variable: Change in Attitude Score.

| Independent Variable:   | Estimated   | t-statistic | Level of     |
|-------------------------|-------------|-------------|--------------|
|                         | Coefficient |             | Significance |
| Num of Sessions         | .19         | 1.01        | .31          |
| Gender                  | -.55        | -.41        | .69          |
| Exercise Days           | -.54        | -1.94 *     | .05          |
| Grade-02                | -4.59       | -2.67 *     | .01          |
| Grade-03                | -2.09       | -1.12       | .27          |
| Grade-04                | -1.60       | -.89        | .38          |
| Grade-05                | -3.36       | -1.80 *     | .07          |
| Grade-06                | .11         | .06         | .95          |
| 3-5 Years Teaching Ex   | .38         | .71         | .48          |
| 6-10 Years Teaching Ex  | 1.39        | 1.67 *      | 1.00         |
| 11-20 Years Teaching Ex | 1.51        | 1.77 *      | .08          |
| 21-20 Years Teaching Ex | 1.98        | .98         | .33          |
| 31+ Years Teaching Ex   | 1.61        | .46         | .65          |

\* significant at the 10% level

Table 19 illustrates the various independent variables and their level of statistical significance in terms of the change in practice score. However, none of the variables

proved to be significant at the 1% or 5% level of significant, although third grade teachers' scores were significant at the 10% level of confidence. The interpretation for the negative estimated coefficient of -10.52 is that third grade teachers scored an average of 10.5 points less for their change of practice scores than did first grade teachers.

Table 19

**Final Model Multiple Regression Summary Table for Estimated Coefficient, t-statistic, and Level of Significance for the Dependent Variable: Change in Practice Score.**

| <u>Independent Variable:</u> | <u>Estimated</u>   |                    | <u>Level of</u>     |
|------------------------------|--------------------|--------------------|---------------------|
|                              | <u>Coefficient</u> | <u>t-statistic</u> | <u>Significance</u> |
| Num of Sessions              | - 4.22             | .068               | .95                 |
| Gender                       | -.71               | -.16               | .87                 |
| Exercise Days                | -.98               | -1.06              | .29                 |
| Grade-02                     | -7.34              | -1.29              | .20                 |
| Grade-03                     | -10.52             | -1.70 *            | .09                 |
| Grade-04                     | -7.72              | -1.30              | .19                 |
| Grade-05                     | -7.84              | -1.27              | .21                 |
| Grade-06                     | -5.82              | -.96               | .34                 |
| 3-5 Years Teaching Ex        | -7.07              | -.40               | .69                 |
| 6-10 Years Teaching Ex       | 1.66               | .61                | .55                 |
| 11-20 Years Teaching Ex      | 1.75               | .62                | .54                 |
| 21-30 Years Teaching Ex      | -.27               | -.04               | .97                 |
| <u>31+ Years Teaching Ex</u> | <u>10.06</u>       | <u>.07</u>         | <u>.39</u>          |

\* significant at the 10% level

Table 20 presents the estimated coefficients, t-statistics, and levels of significance indicating the degree to which the independent variables contributed to the change in total score. This table illustrates that the number of sessions attended is the only statistically significant independent variable at the 1% level. The estimated coefficient for the number of sessions attended, 2.05, indicates that participants had slightly more than a 2 correct answer/point average increase for each in-service training session attended. A participant who attended all eight in-service training sessions would have scored, on the average, 16 questions/points more than those who did not attend any in-service training sessions.

In addition, three independent variables were significant at the 10% level; third grade and fifth grade teachers, and those teachers with between 6 and 10 years of teaching experience. For example, first grade teachers scored an average of a 13-question/point increase when compared to third grade teachers, and an average increase of 12 question/points when compared to fifth grade teachers. The coefficient for teachers with six to ten years of teaching experience, 4.98, produced nearly a 5-point higher average score than teachers with one or two years of experience.

Table 20

Final Model Multiple Regression Summary Table for Estimated Coefficient, t-statistic, and Level of Significance for the Dependent Variable: Change in Total Score.

| Independent Variable:   | Estimated Coefficient | t-statistic | Level of Significance |
|-------------------------|-----------------------|-------------|-----------------------|
| Num of Sessions         | 2.05                  | 3.15 ***    | .00                   |
| Gender                  | -6.93                 | -1.47       | .14                   |
| Exercise Days           | .82                   | .84         | .41                   |
| Grade-02                | -8.32                 | -1.39       | .17                   |
| Grade-03                | -13.07                | -2.01 *     | .05                   |
| Grade-04                | -9.60                 | -1.54       | .13                   |
| Grade-05                | -12.20                | -1.88 *     | .06                   |
| Grade-06                | 4.56                  | -.72        | .47                   |
| 3-5 Years Teaching Ex   | .46                   | .25         | .81                   |
| 6-10 Years Teaching Ex  | 4.98                  | 1.72 *      | .09                   |
| 11-20 Years Teaching Ex | 4.61                  | 1.55        | .12                   |
| 21-30 Years Teaching Ex | .83                   | .12         | .91                   |
| 31+ Years Teaching Ex   | 11.33                 | .93         | .36                   |

\*\*\* significant at the 1% level      \* significant at the 10% level

### Review of Research Hypotheses

The first null hypothesis stated that exposure to a model physical education program would not have an effect on the change in knowledge for elementary classroom teachers on Saipan teaching physical education. As is shown in Table 21, this hypothesis

can be rejected at the one-percent confidence level since the F-stat clearly exceeds the critical value. Furthermore, the final regression model shows for each in-service training session attended teachers gain an average of a 1.07 increase in the total change of knowledge score, holding the other variables in the model constant. With a t-ratio of 5.94, the probability is remote for this to happen by accident for a sample of the size used in this study. This result is consistent with the studies reviewed in Chapter 2, such as the results reported by Sallis (1998), which reported a relationship between in-service training and no in-service training. The same study also stated that the inclusion of an in-service training program was of central importance to the success of the classroom teacher in acquiring the essential and necessary knowledge and skills in order to teach physical education.

Table 21

ANOVA: Restricted Model. Dependent Variable: Change in Knowledge

| Source     | Sum of Squares | df  | Mean Square | F    |     |
|------------|----------------|-----|-------------|------|-----|
| Regression | 1694.82        | 13  | 130.37      | 5.94 | *** |
| Residual   | 3490.10        | 159 | 21.95       |      |     |
| Total      | 5184.91        | 172 |             |      |     |

\*\*\* significance at the 1% level

The second null hypothesis stated that exposure to a model physical education program would not have an affect on the change in attitudes for elementary classroom teachers on Saipan teaching physical education. Table 22 shows that Hypothesis 2 cannot be rejected at the five-percent confidence level since the F-statistic of 1.55 is less than the critical value of 2.59. As such, the change in attitude scores regression is not statistically

significant. This is consistent with a study mentioned in Chapter 2 (Jones, 1999) which also found that change in attitude score could be best learned by practicing positive behaviors.

Table 22

**ANOVA: Restricted Model. Dependent Variable: Change in Attitude**

| Source     | Sum of Squares | df  | Mean Square | F    |
|------------|----------------|-----|-------------|------|
| Regression | 905.09         | 13  | 69.62       | 1.55 |
| Residual   | 7145.47        | 159 | 44.94       |      |
| Total      | 8050.56        | 172 |             |      |

The third null hypothesis stated that exposure to a model physical education program would have no effect on the change in practices for elementary classroom teachers. As shown in Table 23, this hypothesis cannot be rejected at the one-percent confidence level since the model's F-statistic of .44 is below the critical value of 2.97. As such, the change in practice score regression is not statistically significant.

Table 23

**ANOVA: Restricted Model. Dependent Variable: Change in Practices**

| Source     | Sum of Squares | df  | Mean Square | F   |
|------------|----------------|-----|-------------|-----|
| Regression | 2805.17        | 8   | 215.78      | .44 |
| Residual   | 77967.75       | 164 | 490.36      |     |
| Total      | 80772.93       | 172 |             |     |

The fourth null hypothesis stated that exposure to a model physical education program would have no effect on the total change score for elementary classroom teachers

on Saipan teaching physical education. Table 24 illustrates that Hypothesis 4 cannot be rejected at the five-percent confidence level since the F-statistic of 1.44 is below the critical value of 2.97. As such, null hypothesis 4 is not rejected.

Table 24

| <b>ANOVA: Restricted Model. Dependent Variable: Change in Total Score</b> |                 |            |               |          |
|---|-----------------|------------|---------------|----------|
| <b>Source</b>   | <b>Sum of</b>   | <b>df</b>  | <b>Mean</b>   | <b>F</b> |
|   | <b>Squares</b>  |            | <b>Square</b> |          |
| Regression  | 10186.63        | 13         | 783.58        | 1.44     |
| Residual  | 86579.17        | 159        | 544.52        |          |
| <b>Total</b>  | <b>96765.80</b> | <b>172</b> |               |          |

The fifth null hypothesis relates to whether the demographic variables, taken together, had an effect on the change of scores of knowledge, attitudes, practices, and the total score. To test this hypothesis, a regression model was created in which the in-service training/number of sessions attended independent variable was removed. The results of these four regressions are presented in Table 25 and they show that Hypothesis 5 cannot be rejected at the five-percent confidence level since none of the dependent variables' F-values are larger than the critical value of 2.97. This allows us conclusively not to reject this null hypothesis since the demographic variables, taken together, have shown no statistical significance in terms of the change in scores for knowledge, attitudes, practices, and total score.

Table 25

**Model Summaries Used to Test Hypothesis 5**

| <b>Model</b>                 | <b>R<sup>2</sup></b> | <b>Adjusted R<sup>2</sup></b> | <b>F-value</b> | <b>Significant Level</b> |
|------------------------------|----------------------|-------------------------------|----------------|--------------------------|
| <b>Change in scores for:</b> |                      |                               |                |                          |
| Knowledge                    | .04                  | -.03                          | .59            | .85                      |
| Attitude                     | .11                  | .04                           | 1.59           | .10                      |
| Practices                    | .04                  | -.04                          | .48            | .93                      |
| Total Score                  | .05                  | -.02                          | .69            | .76                      |

**Summary**

This chapter began with a review of the purpose of the study and an outline of the methodology used to gather and analyze the data. A description was given of how the sample population was chosen and ways in which the treatment and control groups were demographically similar. Results from multiple regression models were then presented and the data analyzed with respect to the two research questions. Teachers exposed to a model physical education in-service physical education training program showed a statistically significant increase in their knowledge scores. However, these same teachers did not show any significant increase in attitudes toward the teaching of physical education, nor did they change their practices of teaching physical education. Results also show that gender, number of years of teaching experience and the number of exercise days per week were not associated with changes in knowledge, attitudes, and practices.

However, Chapter 5 will demonstrate it may be worthwhile to investigate teachers' practices with a different data-collecting tool, such as direct observation or evaluation of mandatory physical education lesson plans.

## **CHAPTER FIVE**

### **INTRODUCTION, DISCUSSION OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER STUDY**

#### **Introduction**

This chapter briefly reviews the model physical education program, questionnaire utilized, in-service training model, research design, and analysis of data. A discussion of the findings, concerns, valuable insights, conclusions drawn, recommendations for future research, and a concluding summary are also included in this chapter.

The study evolved from the researcher's long-time interest in teaching physical education, developing and implementing physical education curricula, examining physical education program effectiveness, and assessing teachers', principals', and district administrators' level of knowledge of physical education. In 1999, the Public School System (PSS) mandated elementary classroom teachers on Saipan to teach physical education classes. With this mandate, PSS recognized the need to evaluate teachers' levels of knowledge, their attitudes, and the practices they employed while teaching physical education. The interest PSS and the researcher shared in relation to physical education, led to the development of this study.

The purpose of the study was to answer the two research questions. The first asked, "Does exposure to a model health-related physical education program influence or affect a change in attitudes, knowledge, and practices of Saipan elementary school teachers?" The second asked, "Do demographic variables, such as gender, grade level taught, number of years teaching, and number of days an individual exercises per week,

help explain the changes of attitudes, knowledge, and practices of elementary classroom teachers exposed to a model health-related physical education program teaching physical education on Saipan?"

## **Methodology**

### **Literature Review**

To begin answering the two research questions, a thorough literature review was conducted and is reported in chapter two. The literature review investigated studies about elementary teachers' knowledge, attitudes, and practices toward the teaching of elementary physical education. Various model health-related and sport-related physical education programs were also examined. The theories of physical education and current research clearly show that physical education should be a valuable and integral part of the elementary school curriculum. Three of the five goals of physical education as stated by Pangrazi (1998), (see Appendix B, page 3), are unique, and can only be obtained by participating in a well-designed physical education program (Pangrazi, 1998).

Health-related physical education is a new trend in physical education curriculum and is quickly replacing a sport-related physical education program. In a sound health-related physical education program, each child will be active for at least 30 minutes per day in developing the habits and positive attitudes that contribute to an active physical life. Sports-related physical education is predicated upon the teaching of motor-skills, and many times is geared toward the more highly athletically skilled and talented child.

As reported in Chapter 2 a search for studies that examined attitudes, knowledge, and practices of elementary school teachers toward their teaching of physical education

was also conducted. Only one study was found that addressed elementary teachers' attitudes toward physical education. The data from this 1999 study in a Lutheran elementary school was collected by a questionnaire and by personal interviews. The only knowledge study that could be found was a research project that measured the knowledge of health-related physical education majors at an undisclosed university. This knowledge questionnaire was deemed inappropriate for this research due to the fact it was testing knowledge of college level seniors majoring in physical education who were about to graduate and enter the profession of teaching. No study could be located that tested physical education practices. Thus, it appears that no studies, if any, has been attempted that measured knowledge, attitudes, and practices at the same time.

#### Data Collection

The population responding to the research questions was elementary classroom teachers from PSS in the Commonwealth of the Northern Mariana Islands (CNMI). Nine schools took part in this study. Five schools were placed in the treatment group which was the group that received the in-service training. The remaining four schools were placed in the control group, the group that did not receive in-service training. A questionnaire was developed and administered to gather data about classroom teachers' attitudes, knowledge, and practices relating to the teaching of physical education. A pre-test and post-test were administered before and after the in-service training program. The in-service training was based on a model health-related physical education program. A second post-test from the practice section of the questionnaire was administered two months after the first post-test in order to gather more data.

Purposive sampling was used in selecting the treatment and control groups. This is a method of selecting a sample of a population in which certain characteristics are similar. All nine elementary schools teachers' populations are ethnically, economically, and socially analogous. In Saipan's public elementary schools, 173 first through sixth grade teachers participated in this study by filling out the four-part questionnaire (see Appendix A). Six teachers were eliminated from the study because of incomplete questionnaires. Thus 173 out of 179 elementary teachers, represent a successful completion percentage of 96.7. Using the questionnaire, the teachers were asked to respond to questions or statements in relation to their attitudes, knowledge, and practices in the teaching of physical education. Pre-treatment and post-treatment data for both treatment and control groups were gathered by administering the questionnaire to all 173 teachers. Both the pre-test and post-test were administered over a two week period at each of the nine school campuses. In between these tests, an in-service training program was conducted at five elementary schools for an eight-week period. A different elementary school was visited each day of the week. The weekly schedule included San Vicente on Monday, Oleai on Tuesday, Koblerville on Wednesday, Kagman on Thursday, and Tanapag on Friday. After the eight-week training period, the first post-test was given to all 173 teachers from the nine schools. This test took approximately two weeks to administer. Two months later, a second post-test using only the practice section was given to all teachers from the nine schools.

This study began in January of 2001. The last two weeks of January were used to administer the pre-test to all nine schools. The in-service program commenced the first

week in February and was active for eight weeks. The first two weeks in April were used to administer the first post-test. Two months later, during the last week in May and the first week in June, the second post-test was administered. Thus, the entire data collection and in-service training process was twenty weeks in duration.

### Research Design

A quasi-experimental research design was employed because of the need to work with classroom teachers. The purpose was to answer the two research questions. The data was analyzed utilizing multiple regressions. Five independent variables were defined. They included number of years taught, grade level presently teaching, number of exercise days per week, group (meaning whether or not the teacher belonged to the treatment or control group), and gender. Multiple regression analysis was chosen as the appropriate analytical tool because the objective was to determine the degree of relationship, or relationships, among variables from the data that was collected.

Five null hypotheses were stated:

- Hypothesis # 1: Exposure to a model health-related physical education program will not influence or effect a significant change in the knowledge of elementary classroom teachers on Saipan teaching physical education.
- Hypothesis # 2: Exposure to a model health-related physical education program will not influence or effect a significant change in the attitudes of elementary classroom teachers on Saipan teaching physical education.

- Hypothesis # 3: Exposure to a model health-related physical education program will not influence or effect a significant change in the practices of elementary classroom teachers on Saipan teaching physical education.
- Hypothesis # 4: Exposure to a model health-related physical education program will not influence or effect a significant change in the total score of elementary classroom teachers on Saipan teaching physical education.
- Hypothesis # 5: Individually, the independent variables (gender, number of years taught, grade level taught, and number of days per week a person exercises) will not cause a significant difference in attitudes, knowledge, and practices of elementary classroom teachers on Saipan teaching physical education

### Questionnaire

Since few studies address elementary teacher's knowledge, attitudes, and practices, and no useable instrument was found, one was developed for this study. The instrument used consisted of four sections. Validity and reliability were established through a series of steps outlined in Chapter 3. In the first section the participants responded to questions concerning gender, grade level presently teaching, number of years teaching experience, and the number of personal exercise days per week. The second section of the questionnaire was about attitudes. This section consisted of twenty-Likert type statements. Participants used a scale of 1 to 5 to respond to each question. A higher score (5 or 4) designated a more positive attitude. The third section of the questionnaire,

the knowledge section, was made up of 40 multiple-choice questions. Each question listed four possible answers; one correct and three distractors. The final section of the questionnaire dealt with practices. Each participant responded to twenty-Likert questions by using a 1 to 5 scale to answer each question. A higher score (5 or 4) indicated how often positive practices were employed in a physical education class.

### **Limitations**

One of the limitations of this study is the position of the researcher, who was not an employee of the Public School System, only a specialist permitted to provide an in-service physical education training program.

A second limitation of this study is the fact that not all treatment schools received the full eight weeks of in-service training for various reasons.

A third limitation of this study is that a questionnaire may have not been the appropriate instrument to evaluate a change in each of the participants' practices and attitudes when teaching physical education.

### **Model Physical Education Program**

A model physical education program (see Appendix B) was created for use in the CNMI. This model was developed through interviews with physical education professors at several universities; investigating and evaluating the required textbooks for physical education methods courses at selected universities; the researcher's own personal experiences of teaching elementary physical education and physical education method courses while living on Saipan; and personal knowledge of island-type activities that are unique to the customs and culture on Saipan. The physical education model includes

activities and lecture materials from Pangrazi's 13<sup>th</sup> edition of Dynamic Physical Education for Elementary Schools, (Pangrazi, 2001); Graham's 3<sup>rd</sup> Edition of Themes of Physical Education, (Graham, 1999); SPARK (Sports, Play, and Activity Recreation for Kids, 1997); PE-4-ME, Teaching Lifelong Health and Fitness, (Summerford, 2000); and Let's Move, A Physical Education Program for Elementary School Teachers, (Gallahue and Meadors, 1974). The model was also developed from personal interviews with Dr. Nancy B. Schmidt, Department Chair for Health and Physical Education at the University of Guam; Melissa Fletcher, SPARK Physical Education Director of Educational Services at San Diego State University; and the Northern Marianas College's Health, Physical Education, and Athletics Department faculty.

The model physical education program was built with appropriate age groups, developmental levels, and activities in mind (see Appendix B). In the opinion of the researcher, each elementary teacher should know the proper and acceptable progressions for each category, as well as the make-up of activities acceptable for grades K-2, 3-4, and 5-6. For instance, the content and percentage of time spent on many activities in the course of a school year differs according to grade levels.

### **In-service Training**

The Public School System was very receptive to and supportive of the efforts to gather data on the attitudes, knowledge, and practices of elementary school teachers and to hold in-service training at the five selected schools. Even the principals from the selected in-service schools were receptive in allowing a physical education specialist to visit their respective schools once a week for an eight-week period. However, not all

schools received the full eight-week in-service training program. One school, Kagman, closed its school for two weeks in order to fix a potential health hazard. San Vicente teachers used one of their in-service days for an accreditation planning session. Koblerville teachers missed two sessions due to half of the staff having the flu that engulfed Saipan during March. Tanapag teachers missed three sessions for various reasons. Most sessions lasted for one and one half hours and consisted of twenty minutes of lecture followed by class participation in various activities, such as folk and square dance, aerobic dance, physical fitness activities, low-organizational and lead-up games, etc. Almost 100 percent of the 96 elementary teachers in the training group attended at least one in-service training session, with the average session attended by 62 percent of the possible attendees. See table 26 for in-service training schedule.

Table 26

In-service Physical Education Training Schedule

| <u>Week</u>   | <u>Week</u> | <u>Activity</u>                     |
|---------------|-------------|-------------------------------------|
| <u>Number</u> | <u>of</u>   |                                     |
| 1             | Feb 19      | Folk Dance                          |
| 2             | Feb 26      | Square Dance                        |
| 3             | Mar 5       | Stretching and Physical Fitness     |
| 4             | Mar 19      | Locomotor/Non Locomotor Skills      |
| 5             | Apr 2       | Aerobic Dance                       |
| 6             | Apr 9       | Games and Relays                    |
| 7             | Apr 16      | Volleyball skills and lead-up games |
| 8             | Apr 23      | Soccer skills and lead-up games     |

A different activity was presented each session to the participating schools. Folk dancing was introduced in the first week. Square dancing followed in the second week. Low organization games and relays, physical fitness methods, testing, and activities (like stretching), aerobic dance, skills and lead-up games for volleyball and soccer, and classroom activities were introduced in the subsequent weeks. Gymnastics, tumbling, basketball, and softball were not included in this in-service training. Enough new material was presented during the eight weeks. Consequently, time prohibited the inclusion of all facets of an elementary physical education program. Additionally, proper equipment for some activities was not available at any of the five in-service schools. It should be noted that the omission of these activities was not meant to suggest that they were not important.

The first in-service training session was held at Kagman Elementary School. There appeared to be a high level of tension and feelings of anxiety being expressed by the teachers in attendance. Folk dance was the order of the day. The session began with an explanation and a short lecture on the fundamentals of teaching dance, the use of cues, how dance could be integrated with other academic subjects, and the sequence of molding music, rhythm, and dance steps into a synchronized activity. When the participants were placed in dance formation, it appeared the tension and hostility had begun to disappear. For the next 60 minutes, the participants were completely engrossed in a new and exciting activity. The reason for highlighting this particular session is to focus on two questions that were asked when this session came to a close. One participant asked, "Is physical education supposed to be this much fun?" Another individual inquired, "Are we supposed to include these types of activities in our physical education classes?" The ice was broken

at this school and attendance and a positive attitude were always excellent at each remaining session. The other four treatment schools displayed identical enthusiasm at their respective first sessions.

Similar participant reactions were common during the duration of the training. One such situation should also be noted. During a visit to San Vicente Elementary School to set up the date and time for the second post-test, the researcher was approached by four teachers who had participated in all of the sessions at this school. They indicated that they were utilizing the new activities, which were presented during the course of the in-service training, in their physical education classes. They requested that additional in-service training be provided in the future. As a result of this and similar comments, a recommendation is being presented to provide an on-going in-service physical education training program.

### **Analysis of Data**

The data was analyzed using multiple regression models. Each model indicated the percentage of variation in the dependent variables of changes in knowledge, attitudes, and practices by way of the goodness of fit statistic,  $R^2$ . Several regression models were used to evaluate all or various combinations of the independent variables. The objective in doing so was to look for relationships and to observe how well the variables fit with the dependent variables change in score for knowledge, attitudes, practices, and total score. Total score change was calculated by adding together each of the change of scores from knowledge, attitudes, and practices. A regression model consisted of using one dependent

variable separately with all the independent variables of gender, present grade level taught, number of years teaching experience, and number of exercise days per week.

The initial regression model used all the independent variables. As a whole, the only dependent variable that was affected by any of the independent variables was change in knowledge score which was only significantly affected by the independent variable of placement in the in-service group. The data showed that the treatment group participants improved an average of five and half questions more than did participants in the control group. The other dependent variables did not share the same significant statistical increase as the change in knowledge. Three consistencies were noted. First, whenever in-service was included in a model as an independent variable, it was shown to have a statistically significant effect always at the 99% level of significant. Second, none of the other variables showed statistical significance at an acceptable level. Third, some parts of the regression model did show slight improvements.

The regression model that was finally accepted included number of sessions attended instead of in-service training as an independent variable. This model explained 33% of the variation in change of knowledge scores, 5% more than the model in which in-service training was used. The change of knowledge score was statistically significant at the 1% level of confidence. Various independent variables produced an effect on changes in attitudes and total score and met the critical value for the t-distribution at the 10% level. However, no significant difference was found for the change of practice score.

In summary, the examination of data showed that exposure to a model physical education program, through an in-service training program:

- (1) had a significant measurable effect on the change in knowledge;
- (2) did not result in a change in attitude and practice scores; and
- (3) had a significant effect on the change in total score.

This study also found:

- (1) an insignificant relationship existed between the demographic independent variable of gender and change in knowledge, attitudes, practices, and total scores;
- (2) an insignificant relationship also existed between the demographic independent variable number of exercise days per week and change in knowledge, practices, and total scores. However, individuals who exercised three days per week produced a slight relationship with a change in attitude scores;
- (3) an insignificant relationship between the demographic independent variable of grade level taught and change in knowledge scores. However, there were slight relationships between a change in attitude scores and second and fifth grade teachers; change in practice and total scores and third grade teachers; and
- (4) an insignificant relationship existed between the demographic independent variable of number of years teaching and change in knowledge and practices scores. In addition, there was a slight significant relationship between a change in attitude scores and teachers who had six to ten and eleven to twenty years of teaching experience

and change in total scores and teachers who had six to ten years of teaching experience.

### **Interpretations of Findings**

Exposure to a model health-related physical education program through an in-service training program did produce a significant effect on knowledge. However, the same exposure did not have a significant effect on attitudes and practices. Perhaps, what was learned during the eight-week in-service training schedule can be summed up in four points.

1. The change in knowledge is easily measurable by a questionnaire or exam.
2. A questionnaire to measure the change in practices is clearly not the appropriate instrument to measure the level of implementation of practice techniques.
3. Peripheral influences have an enormous effect on attitudes.
4. A positive significant statistical outcome in all three areas from the first ever health-related physical education in-service training program was unrealistic.

The first point, the change in knowledge being easily measurable by a questionnaire or exam, suggests that knowledge is an easy variable to measure. One's knowledge about a specific subject is readily measured by a questionnaire or a test. Subject knowledge is also easily disseminated through pre-service and in-service training classes and methods courses. The acquisition of knowledge can be measured with a paper and pencil exam. Either students respond correctly and perform well, or they do not. If their answers are

correct, they are presumed to have acquired knowledge. Sallis & McKenzie (1997) concluded that classroom teachers, with adequate training and support, could improve their knowledge and teaching of physical education. Barnett and Merriman (1994) theorized that participants in an in-service training program would demonstrate a steady increase in knowledge as the participants progressed through a program of study. Graber (1998) also supports the notion that the acquisition of knowledge is less difficult to measure than the internalization of beliefs or attitudes.

The second point suggests that the questionnaire was not the appropriate tool to use to measure a change in practices. Practices are the habits and methods used to perform the actual instruction of physical education. Unlike testing for knowledge, change in practices may not easily be assessed by a pencil and paper test. Perhaps the singularly best method of evaluating the practices of the teaching of physical education is through direct observation. This would necessitate an administrator or supervisor personally evaluating each teacher's methods and practices in a candid and prompt manner. This personal evaluation, or direct observation of an actual lesson being taught, would then only be beneficial if prompt feedback was made available to the teacher. Follow up observations would also need to be included in this direct observation schema.

The third point suggests that peripheral influences have an immeasurable effect on attitudes. Important peripheral factors that greatly influence a teacher's attitude toward teaching physical education include space, time, equipment, resources, and preparation time (Jones, 1999). In addition, many school district administrators and principals have little or no experience supervising physical education programs and cannot supply the

necessary support needed to provide adequate direction and technical expertise in order to promote change (Sallis et al, 1996). Inadequate support and a lack of prior training or the lack of developing positive experiences in physical education, contribute to classroom teachers embracing negative attitudes toward teaching physical education (Reif & Coulon, 1994).

Teachers with negative attitudes toward the teaching of physical education usually present lessons that are habitually simple, unplanned, or unstructured games such as relays, kickball and softball, dodge ball, and tag games (Reif and Coulon, 1994). These unstructured game type activities provide limited opportunities for students to practice motor skills and develop adequate levels of physical fitness (Faucette, McKenzie, & Patterson, 1990).

A fourth point, suggests that a significant statistically comparable increase in the inclusion of knowledge, attitudes, and practices in the same research study was an impractical expectation. There simply was insufficient time in the eight week, ninety minute weekly sessions, to lecture, provide hands-on activities, and then to provide direct observation/feedback for the 96 treatment group participants.

### **Recommendations for Further Study**

Several recommendations have emerged from this study. The first recommendation is to provide in-service training, utilizing this study's model physical education program, for every elementary teacher on Saipan. If classroom teachers are to continue to teach physical education, they should have the opportunity to build on and also acquire new knowledge, modernize their physical education and health teaching techniques, and

develop a more positive attitude toward the importance of physical education and health. The length of in-service training would be on-going and would last until PSS decides that classroom teachers have acquired sufficient knowledge to be efficient and effective teachers of health-related physical education.

There would be various aspects to this in-service training program. The first would involve the continued building of a solid foundation of a teacher's knowledge of physical education. The data from this study shows that a significant improvement in teacher's knowledge can be obtained through participation in an in-service training program. This teachers' knowledge can be improved with a part hands-on, part lecture format.

This study also revealed that no significant change was affected in teachers' instructional practices and attitudes toward the teaching of physical education. Thus, on-going in-service training program would address the need to improve teaching techniques in physical and health education. The training might also influence elementary teacher attitudes toward physical education and health education. The literature review has shown that practices can be improved by direct observation (Garber, 1998). Utilizing teachers at each elementary school who already employ a positive attitude as role models or physical education resource informants is another way to begin to build positive attitudes toward the importance of physical education. PSS administrators and physical education specialists should observe teachers teaching a physical education class and offer constructive recommendations. To do this it might be best for decision makers and individuals with authority in the Public School System to take part in all physical education in-service training programs.

Attitudes can be affected in a positive manner by utilizing a number of means. Basic physical education equipment and supplies being available to allow for a well-rounded physical education program is an important step in building a positive attitude. Encouraging teachers to recognize the value of the importance of physical education is another way of developing a better attitude. Another method for teachers to develop a more positive attitude toward physical education is to be a role model for their students by incorporating an aerobic exercise and physical fitness program into their own life-style.

The researcher also advocates that parents become actively involved in understanding and appreciating the value of health and physical education matters. Parent Teacher Associations (PTA) meetings, an open house, flyers, health newsletters, and family exercise events can be mediums where parents can be exposed to healthy habits, such as the proper way to stretch, aerobic type activities, wellness activities, aerobic dance sessions, folk and various types of dances instruction, and other health-related physical education activities.

The effectiveness of the above mentioned, modified in-service training program would be evaluated with this study's questionnaire or a modification of it to fit individual school's needs and interests.

Another recommendation would be a program that is designed to help improve school administrators' knowledge and awareness about the importance of physical education and assist them in implementing this information as part of their leadership role. These seminars would emphasize appropriate pedagogical sequences for various activities and appropriate techniques and practices for the teaching of physical education; detail

methods of evaluating a physical education program; and demonstrate how to successfully observe and evaluate a physical education class. Other issues to present would be the proper supplies and equipment needed, number of minutes per physical education class period, and scheduling the use of existing facilities so as not to have all classes participating in physical education at the same time. This study's questionnaire might be employed in evaluating this special administrators physical education in-service training program.

Another recommendation would be to create a physical education certification program through the Northern Marianas College's (NMC) School of Education. NMC has the unique situation in that it is a community college offering an Associate of Arts degree but at the same time offers a 4-year, Bachelor of Science degree in Elementary Education. This certificated program would be instructed and administered by the Northern Marianas College's Health, Physical Education, and Athletics Department. Possible courses for this certification program would be kinesiology, teaching methods for physical fitness and aerobic dance methods, teaching methods for games, dances and sports, psychology of sport, and a basic physical education philosophy and foundation course. Students participating in this certification program could also be trained to be in-service facilitators. This program could lead to a valid research project to study the effectiveness of students in the physical education minor program.

The last recommendation for future study is a longitudinal study on elementary students' performance standards and physical fitness results. This study could be conducted at pre-determined dates, such as mid-year and end-of-year. The results from

this study could be used to educate teachers about the importance and value of physical activity and health education.

### **Study Conclusions**

This study was designed to examine the hypothesis that if elementary classroom teachers' on Saipan were exposed to an in-service model health-related physical education training program, there would be significant changes in their attitudes, knowledge, and practices toward teaching physical education. The study also sought to determine the extent to which gender, grade level currently teaching, number of years teaching experience, and number of personal exercise days per week influenced the attitude, knowledge, and practices in physical education of the same sample population. This investigation found that using a model health-related physical education in-service training program had a significant positive effect on the acquisition of knowledge for those teachers who participated in an in-service training program, but no effect was evident on their attitudes and practices. This investigation also found no significant relationship between genders, nor for the number of personal exercise days per week on knowledge, attitudes, and practices in teaching physical education. However, it did find a slightly significant effect for second and fifth grade teachers on change of attitude scores, third grade teachers and change in practice scores, and teachers with six to ten and eleven and twenty years of teaching experience and number of exercise days per week on a change in attitude scores.

Clearly, the most significant finding this study presents is the importance of the relationship between in-service training programs using a model health-related physical

education program and the significant change in knowledge score. When in-service teachers undergo knowledge-based physical education trainings, the knowledge they have to share with their students in physical education classes is significantly improved. Although this study has not found significant results in the areas of attitudes and practices toward the teaching of physical education, it has presented valuable information on the relationship between in-service training and an increase of knowledge about the teaching of physical education. As more and more school districts adopt the position that elementary physical education can be taught by the classroom teacher, the knowledge portion of the questionnaire becomes a valuable tool in being able to assess the level of knowledge of classroom teachers. If monetary or other constraints make it impossible for specialists to carry out physical education instruction, classroom teachers' physical education knowledge levels need to be ascertained to provide the necessary resources and support for classroom teachers to be successful when implementing a well-rounded, health-related physical education program. Perhaps the model physical education program will need to be revised in the future in order to include a section that discusses appropriate practices and positive attitudes, and how each can be evaluated and assessed by a supervisor.

In conclusion, the results of this study support the following observations:

1. The data gathered through the questionnaire provide insight into what the Saipan elementary classroom teachers know about teaching physical education.
2. Many elementary teachers in this sample did not have an acceptable level of knowledge of the basic concepts of teaching physical education. More in-service

and professional development courses need to be offered in order to raise the level of knowledge of physical education for the classroom teacher.

3. The findings clearly demonstrate that the physical education practices of elementary teachers on Saipan need to be upgraded. Teachers do not seem to be providing adequate and meaningful instruction for lifetime skills through physical education classes.
4. District and school efforts need to be improved to change these teachers' attitudes toward physical education. Among the ways to improve attitudes is to provide adequate physical education supplies, equipment and resources, and administrative support and direction in order to carry out the task of teaching physical education. Teachers need buy into the concept that physical education is an important part of the elementary physical education curriculum.

According to the 1997 CNMI Statistical Yearbook, 33% of the children in the CNMI today are obese. One-third of the youth on Saipan are overweight and at high risk for developing chronic diseases (Eugenio, 2000). Children start their lives being physically active. Over the years, leading a sedentary life-style becomes a habit modeled by parents and educators. Kelly (1996) indicated that 60% of United States elementary school children stand around at recess because of the lack of health-related knowledge of physical education and the desire to be physically fit.

Teachers can be the catalyst that will attract youth into developing a fitness routine and an active life-style. While any adult can bring fitness into the life of a child, teachers and schools are in a uniquely advantageous position to get kids moving. Role modeling

personal fitness by exercising an acceptable number of days per week is an excellent reinforcement for a health-related physical education program in a school system. Attending available physical education methods courses and in-service training programs would provide a teacher new physical education skills, practices, and techniques. Additionally, the knowledge, attitudes, and practices of educators toward a health-related physical education program all play important parts in the instructional configuration.

People begin to acquire and establish patterns of health-related behaviors during childhood (Kelder, Perry, Klepp, & Lytle, 1994). One of the main reasons physical education programs are perceived as expendable is that most adults have few positive memories of their own PE experience (Boyles, 2001). Positive memories and successes need to be the hallmarks of physical education programs. According to the United States Department of Health and Human Services (1997), schools should promote physical activity among children because many young people already have risk factors for chronic diseases associated with adult morbidity and mortality. Teachers and administrators have the potential to improve the fitness and health of young children by providing meaningful, significant, and consequential instruction programs and services that promote enjoyable lifelong fitness and activity. Teachers serve as an effective vehicle for providing educational opportunities in fitness, motor-skills development, and positive habits regarding life-long activities because most children encounter teachers. School personnel should collaborate to develop, implement, and evaluate health-related physical education instruction and programs for young people.

For any elementary physical education program taught by classroom teachers to be successful, teachers must possess positive attitudes, up-dated practices, and an appropriate level of knowledge. Pre-service and in-service training for elementary classroom teachers must be implemented to convey the knowledge, skills, attitudes, and practices necessary to effectively promote a health-related physical education program. It is hoped that this studymay encourage further health-related physical education training programs that will positively influence the health and life-styles of our children.

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# **APPENDIX A**

## **Questionnaire**



## **SECTION II– Attitude Toward Physical Education**

Please respond to the following questions by circling the number that best represents your opinion on the following statements:

- |   |   |                   |
|---|---|-------------------|
| 5 | = | Strongly agree    |
| 4 | = | Agree             |
| 3 | = | Neutral           |
| 2 | = | Disagree          |
| 1 | = | Strongly disagree |

- |    |  |   |   |   |   |   |
|----|--|---|---|---|---|---|
| 1. | Attending an in-service workshop on physical education is one of my priorities as the classroom physical education teacher.    | 5 | 4 | 3 | 2 | 1 |
| 2. | In my school, the physical education class generally turns out to be the same as recess or free play.                          | 5 | 4 | 3 | 2 | 1 |
| 3. | Physical education is an important part of the students' educational experiences at the elementary grade level.                | 5 | 4 | 3 | 2 | 1 |
| 4. | Teaching my own physical education class is enjoyable.   | 5 | 4 | 3 | 2 | 1 |
| 5. | I feel that my college education was adequate in preparing me to teach physical education at the elementary level.             | 5 | 4 | 3 | 2 | 1 |
| 6. | Elementary physical education classes should be taught by a special teacher.   | 5 | 4 | 3 | 2 | 1 |
| 7. | The supervisory help that I receive in physical education is adequate.   | 5 | 4 | 3 | 2 | 1 |
| 8. | The biggest drawback to teaching my own physical education is that I don't have enough time for instruction and participation. | 5 | 4 | 3 | 2 | 1 |
| 9. | Physical education is essential in the elementary curriculum.  | 5 | 4 | 3 | 2 | 1 |

|     |  |   |   |   |   |   |
|-----|--|---|---|---|---|---|
| 10. | The physical education specialist should work cooperatively with the classroom teacher in planning the physical education program.   | 5 | 4 | 3 | 2 | 1 |
| 11. | Recess is an adequate substitute for organized physical education classes.   | 5 | 4 | 3 | 2 | 1 |
| 12. | There is a relationship between gaining satisfactory experiences in play activities and the carryover effect it has on classroom performance.                                  | 5 | 4 | 3 | 2 | 1 |
| 13. | If for any reason a few subjects have to be dropped from the school program, physical education should be one of the subjects dropped.   | 5 | 4 | 3 | 2 | 1 |
| 14. | Time allotment for physical education need not exceed two classes per week.  | 5 | 4 | 3 | 2 | 1 |
| 15. | The classroom teacher, though her/his involvement with the physical education program, will benefit from improved understanding of child behavior in and out of the classroom. | 5 | 4 | 3 | 2 | 1 |
| 16. | Elementary physical education is one of the more important subjects for helping to develop desirable social standards.   | 5 | 4 | 3 | 2 | 1 |
| 17. | The physical education specialist is the only person competent enough to handle an elementary physical education program.  | 5 | 4 | 3 | 2 | 1 |
| 18. | In general, elementary physical education does not receive the emphasis that it should.  | 5 | 4 | 3 | 2 | 1 |
| 19. | The elementary classroom teacher should not be required to teach physical education.   | 5 | 4 | 3 | 2 | 1 |
| 20. | There is an adequate amount of equipment available for physical education instruction.   | 5 | 4 | 3 | 2 | 1 |

**SECTION III – Knowledge of Health-Related Physical Education**

Directions: Each question or incomplete statement is followed by several suggested answers or completions. Circle the one that BEST answers the question or completes the statement

1. Exercise intensity is measured by:
  - A. frequency of performing the activity
  - B. competitive make-up of the activity
  - C. length of time in performing the activity
  - D. heart beats per minute during the activity
  
2. Exercise contributes to a weight control program by:
  - A. increasing expenditure of energy
  - B. increasing appetite
  - C. decreasing resting metabolic rate
  - D. decreasing self-esteem
  
3. The most popular field test of flexibility is:
  - A. sit and reach
  - B. hurdle stretch
  - C. horizontal prone chest lift (lie on stomach and lift chest off of floor)
  - D. standing toe touch
  
4. Which of the following technique is suggested as an effective approach for maintaining appropriate behavior in an entire class?
  - A. positive behavioral feedback
  - B. behavior contracts
  - C. calls to parents
  - D. involving the principal
  
5. Which of the following is the lease effective activity for developing cardiovascular endurance?
  - A. basketball
  - B. softball
  - C. jogging
  - D. walking
  
6. A teacher can measure cardiovascular endurance by:
  - A. 3 minute step test
  - B. 3 mile walk
  - C. 1.5 mile run/ walk
  - D. all of the above

7. The test that is most frequently used to measure abdominal strength is:
- A. pull-ups
  - B. push-ups
  - C. sit-ups
  - D. measure your abdominal region with a tape measure
8. Which of the following statements best defines Health-Related Physical Education?
- A. helps improve performance in motor tasks related to sport and athletics
  - B. emphasis is placed on being able to function effectively in everyday activities
  - C. main focus is placed on improving speed, agility, balance, coordination and power
  - D. emphasizes competition between teams and or individuals
9. Bending, twisting, and swaying are more specifically identified as:
- A. body management competency
  - B. locomotor movement
  - C. nonlocomotor movement
  - D. manipulative skills
10. Which of the following groups should be responsible for providing lifestyle fitness for children?
- A. parents
  - B. community organizations
  - C. classroom teachers and school administrators
  - D. all of the above
11. When stretching, it is best to:
- A. bounce when doing a stretch
  - B. stretch until there is pain (no pain, no gain)
  - C. gently move into a stretch and hold for 30 seconds
  - D. all of the above
12. What percentage of the physical education curriculum should a 3-4 grade physical education class be involved with team sports:
- A. 7%
  - B. 17%
  - C. 27%
  - D. 37%.
13. When students choose squads/teams, it is best to:
- A. let students choose their own squads/teams
  - B. have student leaders choose squads/teams
  - C. pick numbers out of a box/hat
  - D. all of the above

14. Of the following motivation techniques, which one would be considered intrinsic?
- A. class choice of activity for the day
  - B. each child should progress through a skill at their own pace
  - C. good behavior by entire class results in ice cream and cake at the end of the semester
  - D. use push-ups as a means of punishment for unacceptable behavior
15. Concerning physical fitness which of the following statements is considered the least effective?
- A. the name of the game is pain
  - B. all physical fitness activities should be fun
  - C. physical fitness activities should provide success
  - D. physical fitness activities should motivate children to improve themselves
16. All of the following statements are true except:
- A. reinforce the performances of all students regardless of gender
  - B. provide activities that are developmentally appropriate and allow all students to find success
  - C. design programs that assure success in coeducational experiences
  - E. "You throw like a girl," should be an acceptable descriptive comment
17. When communicating with students, all of the following statements are correct except:
- A. speak about the behavior rather than about the student's character or background
  - B. try to understand the child's point of view
  - C. accentuate the negative aspect of the lesson, i.e.; "Don't do this"
  - D. evaluate the situation at hand, not an incident from last week
18. Which of the following is the most accurate when discussing developmental patterns?
- A. development in general proceeds from head to foot
  - B. children control their arms before their hands
  - C. gross motor skills are learned before fine motor skills
  - A. all are correct
19. With regards to Instructional Cues, of all the following statements the least effective is:
- A. cues are long sentences that describe an action
  - B. use short, action-oriented cues
  - C. cues should put the parts of a skill together
  - D. develop precise cues

20. In demonstrating a skill or an activity, it is important for the teacher:
- A. to stand with his/her back to the sun
  - B. to stand facing the sun.
  - C. to stand with the sun on his/her right shoulder
  - E. to stand with the sun on his/her left shoulder
21. Concerning classroom management, which of the following statements is correct:
- A. the more rules a teacher has, the better behaved the class will be
  - B. rules should be positive and not negative
  - C. rules are not needed for equipment or process
  - D. rules should be written in stone
22. Which of the following statements is considered the least effective when developing physical education programs?
- A. emphasize enjoyable participation in physical activities that are easily done throughout life
  - B. provide children the opportunity to play a team sport at an early age
  - C. offer a diverse range of noncompetitive and competitive activities appropriate for age and ability
  - D. give children the skills and confidence needed to be physically active
23. All of the following items are components of health-related physical fitness except:
- A. speed
  - B. body Composition
  - C. muscular endurance and strength
  - D. cardiovascular fitness
24. All of the following items are components of skill-related physical fitness except:
- A. agility
  - B. flexibility
  - C. balance
  - D. coordination
25. Concerning motor development, which of the following statements is correct:
- A. motor development is a finite process that ends at a predetermined age
  - B. all children at a given age can be expected to exhibit the same level of development in their motor skills
  - C. most children do not perform the fundamental motor skills correctly
  - D. there is only one correct form of each fundamental motor skill

26. Which of the following statements best describes what Physical Education should be?
- A. recess time and free play
  - B. time to provide planning period for classroom teachers
  - C. fun time to expend excess energy that is built up from sitting in a classroom
  - D. should be an experience that guides youngsters in the process of becoming physically active for a lifetime
27. Which of the following should not be included in a physical education instructional program?
- A. practice for after-school sports competition
  - B. swimming unit
  - C. golf unit
  - D. gymnastics unit
28. When constructing a curriculum, which of the following statements is correct:
- A. a conceptual framework for the curriculum must be constructed
  - B. organized philosophy should be up to the individual teacher
  - C. needs of students do not need to be addressed
  - D. program objectives and goals can emerge over time
29. Of the following sports, the one where the ball is considered to be legally out of play when the ball rests on or touches a boundary line is
- A. basketball
  - B. soccer
  - C. volleyball
  - D. softball
30. When performing abdominal exercises (sit-ups, curl-ups, crunches) which of the following statements is correct:
- A. back should be straight
  - B. hands behind neck with fingers inter-locked
  - C. legs should be straight and not bent
  - D. personalize the workout by allowing students to accomplish as many reps as possible
31. Concerning punishment, which of the following statements is correct:
- A. running laps is OK as punishment
  - B. fitness skills, such as push-ups, can be used as punishment
  - C. taking away something that is desired is an effective punishment
  - D. embarrassing a student who has misbehaved is a proper punishment

32. Concerning square/folk dancing in the curriculum, which of the following statements is correct:
- A. square dancing has no value in the physical education curriculum
  - B. many students can be involved at one time
  - C. there is maximal cost for square dancing, such as the cost of music and player
  - D. there is a no social value with square dancing
33. Which of the following statements is not correct with regards to rhythmic movement?
- A. one's own traditional dances are considered part of the rhythmic-dance section
  - B. when introducing a new dance, practice the steps without the music first
  - C. break down and practice the rhythm activity by parts and then put the dance together
  - D. mixers do not work and should not be used to get all students involved doing rhythms
34. Which of the following statements is the most appropriate physical fitness practice?
- A. physical fitness tests are given twice a year
  - B. physical fitness tests are given for the purpose of qualifying children for awards
  - C. ongoing fitness assessment is conducted throughout the school year
  - D. children should be required to take physical fitness tests without adequate conditioning
35. With regards to low-organization games, all of the following statements are correct except:
- A. it is effective to stop a new game at the height of interest
  - B. make sure all students have a chance to participate in games that require taking turns
  - C. social learning can take place in the simplest of games. Children can call infractions
  - D. winners should play the game for as long as they can win
36. Which of the following activities should always be part of a physical education lesson plan?
- A. introductory activity
  - B. physical fitness development activity
  - C. games and relays
  - D. competition between teams
37. Concerning the cool down, all of the following statements are correct except:
- A. stretching is important after exercising
  - B. letting the blood flow evenly through-out the body is an important part of cooling-down
  - C. drinking water after exercise should be encouraged
  - D. it is ok to send students back into the classroom with hot, sweaty bodies

38. Concerning low-organizational games, all of the following statements are correct except:

- A. put students in game formation before explaining the game
- B. instructions should be detailed, long and lengthy
- C. try the game first, and then answer any questions
- D. have a brief trial period during first stages of game is important

39. A “warm-up” exercise precedes strenuous physical activity in order to:

- A. prepare the individual psychologically for strenuous exercise
- B. gradually increase lung capacity
- C. prevent strains
- D. replace the store of glycogen

40. A characteristic of an inappropriate practice in a low-organizational game for children is:

- A. teachers and children modify the rules
- B. children participate in teams of two to three children
- C. teachers focus on cooperation and not winning
- D. teams are formed by captains

## SECTION IV – Practices and Techniques of teaching Physical Education

Please respond to the following questions by circling the number that best represents your practices for the following statements:

- |   |   |                           |
|---|---|---------------------------|
| 5 | = | I always do               |
| 4 | = | I do most of the time     |
| 3 | = | I do sometimes            |
| 2 | = | I almost never do         |
| 1 | = | I never do/Not applicable |

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. How often do you use a lesson plan for your physical education classes?   | 5 | 4 | 3 | 2 | 1 |
| 2. How often do you include a list of equipment, supplies and instructional devices that you will need?                    | 5 | 4 | 3 | 2 | 1 |
| 3. How often do you list the objectives of the physical education lesson on your lesson plan?                              | 5 | 4 | 3 | 2 | 1 |
| 4. How often do you included an introductory activity, fitness component, lesson focus and game activity for every lesson? | 5 | 4 | 3 | 2 | 1 |
| 5. How often do you provide for continuity with previous lessons?  | 5 | 4 | 3 | 2 | 1 |
| 6. How often do you review past material through lead-up activities?   | 5 | 4 | 3 | 2 | 1 |
| 7. How often do you communicate to students why the physical education material is important to learn?                     | 5 | 4 | 3 | 2 | 1 |
| 8. How often do you build motivational techniques into your presentation?  | 5 | 4 | 3 | 2 | 1 |
| 9. How often do you provide for students with various interests and abilities?   | 5 | 4 | 3 | 2 | 1 |
| 10. How often do you include students with disabilities?   | 5 | 4 | 3 | 2 | 1 |
| 11. How often do you provide a warm-up activity for each session?  | 5 | 4 | 3 | 2 | 1 |

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 12. How often do you provide for a physical fitness activity for each session?               | 5 | 4 | 3 | 2 | 1 |
| 13. How often do you provide for an instructional component?                                 | 5 | 4 | 3 | 2 | 1 |
| 14. How often do you explain new material clearly and with enough depth?                     | 5 | 4 | 3 | 2 | 1 |
| 15. How often do you progress from simple to complex skill development?                      | 5 | 4 | 3 | 2 | 1 |
| 16. How often do you progress from known activities to unknown activities?                   | 5 | 4 | 3 | 2 | 1 |
| 17. How often do you include demonstration on the correct way to perform the skill/activity? | 5 | 4 | 3 | 2 | 1 |
| 18. How often do you include key points that should be covered?                              | 5 | 4 | 3 | 2 | 1 |
| 19. How often do you allow a unit of instruction to last only from 1 to 3 weeks?             | 5 | 4 | 3 | 2 | 1 |
| 20. Does your lesson provide for feedback/reflection during and after the lesson?            | 5 | 4 | 3 | 2 | 1 |

**Thank you for your participation**

# **APPENDIX B**

## **Model Health-Related Physical Education Program**

**A MODEL HEALTH-RELATED  
PHYSICAL EDUCATION PROGRAM**

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**February 12, 2001**

## TABLE OF CONTENTS

| <b><u>CONTENT</u></b>  | <b><u>PAGE</u></b> |
|--|--------------------|
| Table of Contents  | 163                |
| Introduction   | 165                |
| Goals and Objectives   | 166                |
| Developmental Levels   | 167                |
| <br>   |                    |
| Program Emphasis Chart   | 169                |
| National Standards for Physical Education                                | 170                |
| A Physically Educated Individual   | 171                |
| Definition and Outcomes of the Physically Educated Person                | 172                |
| National Standards for Beginning Physical Education Teachers             | 174                |
| <br>   |                    |
| Key Principles of a Dynamic Health-Related<br>Physical Education Program | 176                |
| Organizing and Conducting the Program                                    | 177                |
| Lesson Plan Time Allotment   | 179                |
| Lesson Plan Example  | 180                |
| Ways to Avoid Possible Discipline Situations                             | 182                |
| <br>   |                    |
| Helpful Hints for Teaching Games and Relays                              | 183                |
| Choosing Games of Low Organization                                       | 183                |
| Presenting Games   | 184                |
| Supervising Games Being Played   | 185                |
| Hints for Teaching Classroom Games                                       | 186                |
| <br>   |                    |
| Hints for Teaching Relays  | 187                |
| Hints for Teaching Skill Drills and Lead-up Games                        | 188                |
| General Suggestions for Teaching Physical Education Activities           | 189                |
| Benefits and Consequences  | 190                |
| Benefits of Physical Activity  | 190                |
| <br>   |                    |
| Consequences of Physical In-Activity                                     | 191                |
| Physical Activity Among Young People                                     | 192                |
| Physical Fitness   | 193                |
| Physical Fitness Test  | 194                |
| Recommendations  | 195                |
| <br>   |                    |
| Suggested Activities for Each Developmental Level                        | 198                |
| Developmental I  | 198                |

|   |            |
|---|------------|
| <b>Developmental II</b>   | <b>199</b> |
| <b>Developmental III</b>  | <b>200</b> |
| <b>Suggested Developmental Level I – Yearly Activity Plan</b>   | <b>201</b> |
| <b>Suggested Developmental Level II – Yearly Activity Plan</b>  | <b>204</b> |
| <b>Suggested Developmental Level III – Yearly Activity Plan</b> | <b>207</b> |
| <b>References</b>   | <b>210</b> |

## INTRODUCTION

This Model Health-Related Physical Education program has been written expressly for classroom teachers in the elementary school who are charged with the responsibility of teaching their own physical education classes. Ideally, elementary physical education specialists should be employed by school systems and be responsible for organizing and implementing educationally sound motor development and activities to develop life-long skills.

Components of health-related physical education are vastly different from the traditional sports-related physical education components. The attributes for each are:

### **Health-related**

Cardiovascular Endurance  
Muscular Endurance  
Muscular Strength  
Flexibility  
Body Mass Index

### **Sports-related**

Balance  
Speed  
Agility  
Power  
Coordination

This model is directed toward the elementary classroom teacher who desires to make the physical education instruction experience one that goes beyond fun and strives to enhance the movement and fitness abilities of all children.

The materials in this model are in no way entirely new or a complete compilation of all the appropriate movement experiences for elementary school children. This model is intended to serve as stimulus material to help the interested but relatively inexperienced teacher begin to develop a sound physical education program.

The philosophy behind this model physical education program is to provide activities that will keep children activity for at least thirty-minuets per day. These activities will provide the foundation in which children will develop healthy bodies and at the same time develop a positive attitude toward being active for the rest of their lives.

## GOALS & OBJECTIVES FOR MODEL PHYSICAL EDUCATION PROGRAM

### Emphasis on Health-Related Activities

This physical education model program encompasses five goals or objectives. It is important to note that three of these goals are unique to physical education programs.

1. **Motor Skills and Movement Competence:** The physical education program will help children become competent in a variety of motor skills and movements.
2. **Personal Health and Wellness Skills:** The physical education program will provide children an opportunity to participate in activities designed to develop and maintain personal health through physical activity and fitness. Students will also develop an understanding of how to maintain wellness through life.
3. **Human Movement Principles:** Children will experience a broad variety of movement activities and develop an understanding of movement principles. Youngsters will develop an understanding of their strengths and limitations in the motor performance arenas and know how to select activities that assure their safety.
4. **Lifetime Participation in Activity:** Through physical education, children will learn physical skills that allow them to participate in and enjoy physical activity throughout their adult years.
5. **Social Skills and Positive Self-Concept:** The physical education environment will help children acquire desirable social standards and ethical concepts. In addition, physical education instruction will offer experiences that help children develop a positive self-image.

## DEVELOPMENTAL LEVELS

### EQUATING DEVELOPMENTAL LEVELS TO GRADES AND AGES

Activities and units of instruction are grouped into developmental levels throughout this model. For effective learning, activities and skills must be presented in a developmentally appropriate form, one that assures success. The above table illustrates the continuum of skill development through which most youngsters progress. Even though this developmental skill continuum is common to all youngsters, there is great variability among children. Placing activities in developmental levels encourages offering activities that are appropriate for the maturity and developmental level of each youngster. When necessary, incorporate activities from the level that best suits the individual student.

Deciding how to arrange activities for instruction is difficult because schools group children by chronological age and grade rather than development level. The above table (figure 1.1) shows how developmental levels roughly equate with grades and ages. It also is broken down by percentage of the program as well as suggested number of weeks that each objective should be taught. The following section describes characteristics of learners at each level and identifies skills and competencies typical of children in each of the levels.

Table 1.1

| Developmental Level | Grades | Ages  |
|---------------------|--------|-------|
| I                   | K-2    | 5-7   |
| II                  | 3-4    | 8-9   |
| III                 | 5-6    | 10-11 |

**Developmental Level I:** For the majority of children, activities placed in Developmental Level I are appropriate for kindergarten through second grade children. The majority of activities for younger children are individual in nature and center on learning movement concept through theme development. Children learn about movement principles, and educational movement themes are used to teach body identification and body management skills. By stressing joy and personal benefits through physical activity, positive behaviors can be developed that last a lifetime.

**Developmental Level II:** Developmental Level II activities are usually appropriate for the majority of third and fourth graders. In developmental level II activities, refinement of fundamental skills occurs and the ability to perform specialized skills begins to surface. Practicing manipulative skills enhances visual-tactile coordination. This is a time when children explore, experiment, and create activities without fear. While not stressing conformity, children learn the how and the why of activity patterns. Cooperation with peers receives more emphasis through group and team play. Initial instruction in

sport skills begins in development level II, and a number of lead-up activities allow youngsters to apply newly learned skills in a small group setting.

**Developmental Level III:** Developmental Level III activities place more emphasis on specialized skills and sport activities. The majority of activities at this level are used with fifth and sixth grade students. Sport offerings may include basketball, softball, volleyball, soccer, cross-country and track and field. Students learn and improve sport skills while participating in cooperative sport lead-up games. Less emphasis is placed on movement concepts activities and a larger percentage of instructional time is devoted to manipulative activities. Adequate time is set aside for the rhythmic and dance program.

(Pangrazi, 1998)

## PROGRAM EMPHASIS CHART

### Physical Education Objectives

### Yearly Percentage of Time

#### Developmental Level I

|   |                        |
|---|------------------------|
| Fitness and wellness activities           | 28% (10 weeks)         |
| Movement concepts and themes              | 13% ( 5 weeks)         |
| Fundamental and manipulative motor skills | 9% ( 3 weeks)          |
| Rhythmic and dance movement skills        | 22% ( 8 weeks)         |
| Swimming/Gymnastic skills                 | 10% ( 4 weeks)         |
| Low Organizational Games/Relays           | <u>18% ( 6 weeks)</u>  |
| <b>Total</b>                              | <b>100% (36 weeks)</b> |

#### Developmental Level II

|  |                        |
|--|------------------------|
| Fitness and wellness activities            | 28%(10 weeks)          |
| Sport skills/Team Sports-Individual Sports | 17% ( 6 weeks)         |
| Fundamental and manipulative motor skills  | 4% ( 2 weeks)          |
| Rhythmic and dance movement skills         | 18% ( 6 weeks)         |
| Swimming/Gymnastic skills                  | 10% ( 4 weeks)         |
| Low Organizational Games/Relays            | <u>23% ( 8 weeks)</u>  |
| <b>Total</b>                               | <b>100% (36 weeks)</b> |

#### Developmental Level III

|   |                        |
|---|------------------------|
| Fitness and wellness activities           | 28% (10 weeks)         |
| Sport skills/Team-Individual Sports       | 28% (10 weeks)         |
| Fundamental and manipulative motor skills | 4% ( 2 weeks)          |
| Rhythmic and dance movement skills        | 15% ( 5 weeks)         |
| Swimming/Gymnastic skills                 | 10% ( 4 weeks)         |
| Low Organizational Games/Relays           | <u>15% ( 5 weeks)</u>  |
| <b>Total</b>                              | <b>100% (36 weeks)</b> |

## **National Standards for Physical Education**

**A physically educated individual can:**

- 1. Demonstrate competency in many movement forms and proficiency in a few movement forms.**
- 2. Apply movement concepts and principles to the learning and development of motor skills.**
- 3. Achieve and maintains a health-enhancing level of physical fitness**
- 4. Exhibit a physically active lifestyle.**
- 5. Demonstrate responsible personal and social behavior in physical activity settings.**
- 6. Demonstrate understanding and respect for differences among people in physical activity settings.**
- 7. Understand that physical activity provides opportunities for enjoyment, challenge, self-expression, and social interaction.**

**(Sammann, 1998; Pangrazi, 1998)**

## **A PHYSICALLY EDUCATED INDIVIDUAL**

### **Has learned skills necessary to perform a variety of physical activities:**

- Moves using concepts of body awareness, space awareness, effort, and relationships.
- Demonstrates competency in a variety of manipulative, locomotor, and nonlocomotor skills.
- Demonstrates competencies in combinations of manipulative, locomotor, and nonlocomotor skills performed individually and with others.
- Demonstrates competency in many different forms of physical activity.
- Demonstrates proficiency in a few forms of physical activity.
- Has learned how to learn new skills.

### **Is physically fit:**

- Assesses, achieves, and maintains physical fitness;
- Designs safe, personal fitness programs in accordance with principles of training and conditioning.

### **Does participate regularly in physical activity:**

- Participates in health enhancing physical activity at least three times a week.
- Selects and regularly participates in lifetime physical activities.
- 

### **Knows the implications of and the benefits from involvement in physical activities:**

- Identifies the benefits, costs, and obligations associated with regular participation in physical activity.
- Recognizes the risk and safety factors associated with regular participation in physical activity.
- Applies concepts and principles to the development of motor skills
- Understands that wellness involves more than being physically fit.
- Knows the rules, strategies, and appropriate behaviors for selected physical activities.
- Recognizes that participation in physical activity can lead to multicultural and international understanding
- Understands that physical activity provides the opportunity for enjoyment, self-expression, and communication.

### **Values physical activity and its contributions to a healthful lifestyle:**

- Appreciates the relationships with others that result from participation in physical activity.
- Respects the role that regular physical activity plays in the pursuit of life-long health and well-being.
- Cherishes the feelings that result from regular participation in physical activity.

## **DEFINITION AND OUTCOMES OF THE PHYSICALLY EDUCATED PERSON**

As a result of participating in a quality physical education program it is reasonable to expect that the student will be able to:

1. Throw a variety of objects demonstrating both accuracy and distance (e.g., Frisbees, deck tennis rings, softballs).
2. Continuously strike a ball to a wall or a partner, with a paddle, using forehand and backhand strokes.
3. Consistently strike a ball, using a baseball/softball bat, so that it travels in an intended direction and height.
4. Design and perform gymnastics and dance sequences that combine traveling, rolling, balancing, and weight transfer into smooth, flowing sequences with intentional changes in direction, speed and flow.
5. Hand dribble and foot dribble while preventing an opponent from stealing the ball.
6. In a small group keep an object continuously in the air without catching it (e.g., ball, foot, bag).
7. Consistently throw and catch a ball while guarded by opponents.
8. Design and play small-group games that involve cooperating with others to keep an object away from opponents, (basic offensive and defensive strategy) (e.g., by throwing, kicking, or dribbling a ball).
9. Leap, roll, balance, transfer weight, bat, volley, hand and foot dribble, and strike a ball with a paddle, using mature motor patterns.
10. Demonstrate proficiency in front, back, and side swimming strokes.
11. Participate in vigorous activity for a sustained period of time while maintaining a target heart rate.
12. Recover from vigorous physical activity in an appropriate length of time.
13. Monitor heart rate before, during and after activity.
14. Correctly demonstrate Health-related physical fitness activities designed to improve and maintain muscular strength and endurance, flexibility, body mass index, and cardiorespiratory endurance.

15. **Participate in games, sports, dance and outdoor pursuits, both in and outside of school, based on individual interests and capabilities.**
16. **Recognize that idealized images of the human body and performance, as presented by the media, may not be appropriate to imitate.**
17. **Recognize that time and effort are prerequisites for skill improvement and fitness benefits.**
18. **Recognize the role of games, sports, and dance in getting to know and understand others of like and different cultures.**
19. **Identify opportunities in the school and community for regular participation in physical activity.**
20. **Identify principles of training and conditioning, and cool-down techniques and the reasons for using them.**
21. **Identify benefits resulting from participation in different forms of physical activities.**
22. **Detect, analyze and correct errors in personal movement patterns**
23. **Describe ways to use the body and movement activities to communicate ideas and feelings.**
24. **Accept and respect the decisions made by game officials, whether they are students, teachers, or officials outside of school.**
25. **Seek out, participate with, and show respect for persons of like and different skill levels.**
26. **Choose to exercise at home for personal enjoyment and benefit.**

## **NATIONAL STANDARDS FOR BEGINNING PHYSICAL EDUCATION TEACHERS**

In 1995, NASPE published the first national standards for beginning physical-education teachers (NASPE, 1995b). These standards can be used by state and national accrediting review teams to assess the degree to which any college or university program meet the needs of beginning teachers. Inevitably, in this process, programs of teacher preparation will change, so that content and experiences more closely match the intended knowledge and performance indicators described in the standards.

### **NASPE Beginning Physical-Education Teacher Standards**

#### **Standard 1 – Content Knowledge**

The teacher understands physical education content, disciplinary concepts, and tools of inquiry related to the development of a physically educated person.

#### **Standard 2 – Growth and Development**

The teacher understands how individuals learn and develop and can provide opportunities that support their physical, cognitive, social and emotional development.

#### **Standard 3 – Diverse Learners**

The teacher understands how individuals differ in their approaches to learning and creates appropriate instruction adapted to diverse learners.

#### **Standard 4 – Management and Motivation**

The teacher uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning and self-motivation.

#### **Standard 5 – Communication**

The teacher uses knowledge of effective verbal, nonverbal, and media communication techniques to foster inquiry, collaboration, and engagement in physical activity settings.

#### **Standard 6 – Planning and Instruction**

The teacher plans and implements a variety of developmentally appropriate instructional strategies to develop physically educated individuals.

#### **Standard 7 – Learner Assessment**

The teacher understands and uses formal and informal assessment strategies to foster physical, cognitive, social and emotional development of learners through physical activity.

#### **Standard 8 – Reflection**

The teacher is a reflective practitioner who evaluates the effects of his or her actions on

others and seeks opportunity to grow professionally.

**Standard 9 – Collaboration**

The teacher fosters relationships with colleagues, parents/guardians, and community agencies to support learners' growth and well-being.

(AAPHERD, 1999b)

## **Key Principles of a Dynamic Health-Related Physical Education Program**

Physical education programs for young people are most likely to be effective when they do the following:

1. Emphasize enjoyable participation in physical activities that are easily done throughout life.
2. Offer a diverse range of noncompetitive and competitive activities appropriate for different ages and abilities.
3. Promote physical activity through school health program and community programs.
4. Have students be physically active for up to 30 minutes a day at or near minimum or maximum training heart rate.

## **ORGANIZING AND CONDUCTING THE PROGRAM**

The following is a list of suggestions for organizing and conducting the elementary physical education program. Read each item carefully and project how you would implement each suggestion in actual teaching situations:

1. Keep verbalization to a minimum.
2. Don't begin until everyone is listening.
3. Stand where everyone can see you and hear you.
4. Do not "talk down" to students, but use a vocabulary that is understandable to them.
5. Summarize, using key words or phrases.
6. Utilize brief demonstrations in conjunction with explanation.
7. Analyze initial performance of the task. Comment on general problems, assist individually with specific problems.
8. When asking for questions from the class, be specific in nature.
9. Demonstrate correct performance of the whole activity.
10. Select pupils to demonstrate that perform the skill reasonably well (no need to be highly skilled) or have solved the problem in a unique manner.
11. Utilize demonstrations and audio-visual aids when possible.
12. Place emphasis on the techniques employed during the demonstration rather than the results.
13. Demonstrate an activity more than once and provide opportunity for practice immediately after.
14. Give everyone chances to demonstrate at various times during the school year.
15. Constantly observe and evaluate your students' performance. Alter your approach and emphasis to meet the pupils' needs.
16. Encourage self-evaluation of progress by students.
17. Utilize the final few minutes of review, self-evaluation, and planning with the children for the next lesson.
18. Evaluate the lesson yourself in terms of achievement of your specific objectives.
19. Be thoroughly prepared. Over plan, and know exactly what you intend to do from minute to minute, and how you plan to do it.
20. Be cheerful and show a genuine interest in your students, but do not become "buddy-buddy" with them or "one of the boys."
21. Have a thorough knowledge of the activity to be taught before introducing it.
22. Have on hand and readily available all necessary equipment and other required materials.
23. Develop in students a general understanding of the rules and regulations of the activity before starting to play. (Additional rules and regulations may be explained as the need arises.)
24. Keep all students actively participating throughout the period whenever possible
25. Help students achieve a reasonable degree of proficiency in skill by devoting sufficient time to squad practice in skills.
26. Provide opportunities for the atypical child to engage in and derive satisfaction

- from participation in appropriate activities.
27. Equalize teams from the standpoint of skills and abilities so that no one team monopolizes an activity.
  28. Modify rules and sizes of activity areas according to the needs determined by the ability and sizes of the class.
  29. Develop a spirit of fun and pleasure during activities.
  30. Treat all students fairly, recognizing individual differences and avoiding embarrassment of those who have made mistakes.
  31. Offer as many varied activities as time, space, and equipment will allow. An activity should be continued long enough for students to become moderately skilled in it, but as a general rule six weeks should be the maximum length of time given to any one activity in a school year.
  32. Include activities in the program that will be of interest to students in their leisure time.
  33. In the interest of public relations, include some activities that lend themselves to demonstrations.
  34. Keep the program flexible so changes can be made without interrupting the continuity of the whole program. Plans for inclement weather should be made in advance.
  35. Be observant of individual differences. Structure lessons so that all will achieve a reasonable degree of success and at the same time feel challenged by the activity experiences.

## LESSON PLAN TIME ALLOTMENT

Various parts or phases of a physical education daily lesson.

|    |  |                  |
|----|--|------------------|
| 1. | Physical Fitness (If today's lesson is not PF)         | 5 minutes        |
| 2. | Review of previous lesson (if appropriate)             | 5 minutes        |
| 3. | Introduce skill or activity                            | 8 minutes        |
| 4. | Appropriate games, rhythms, or self-testing activities | 17 minutes       |
| 5. | Cool-down/stretch and summary of day's lesson          | <u>5 minutes</u> |
|    |  | 40 minute total  |

## Lesson Plan Example

**Level** \_\_\_\_\_

|                    |                            |
|--------------------|----------------------------|
| <b>Objectives:</b> | <b>Equipment Required:</b> |
|--------------------|----------------------------|

|                                 |                            |
|---------------------------------|----------------------------|
| <b>Instructional Activities</b> | <b>Reading, HW, (Etc.)</b> |
|---------------------------------|----------------------------|

**Fitness Development Activity -**

|  |  |
|--|--|
|  |  |
|--|--|

**Lesson Focus -**

|  |  |
|--|--|
|  |  |
|--|--|

**Lesson Activities**

|  |  |
|--|--|
|  |  |
|--|--|

|  |  |
|--|--|
|  |  |
|--|--|

| <b>Strengths:</b> | <b>Weakness:</b> |
|-------------------|------------------|
|                   |                  |

## **WAYS TO AVOID POSSIBLE DISCIPLINE SITUATIONS**

It must be remembered that the techniques for handling discipline problems outlined above do not get at the source of the problem. They are merely methods of handling overt signs of behavior.

The best method of handling behavior problems is a program designed at preventing them from occurring in the first place. This can best be done by understanding learning behavior and each child's individual situation. There are many things that the teacher can do to prevent discipline problems from arising. Among these are:

1. Be thoroughly prepared for each class.
2. Over plan.
3. Have something to interest each child.
4. Challenge the students.
5. Structure situations so that all may achieve some degree of success.
6. Always maintain emotional control of yourself (keep your "cool").
7. Maintain voice control.
8. Do not regard children's actions as a personal affront.
9. Maintain a distinction between teacher and pupil. Do not become involved in the dangers of popularity seeking among students.
10. Avoid the use of sarcasm in the classroom.
11. Remove temptations.
12. Be enthusiastic.
13. Be sincerely interested in helping each child learn.
14. Be patient and polite.
15. Make the children aware of your expectations prior to the activity or at the start of the school year.
16. Respect their rights of the children.

## **HELPFUL HINTS FOR TEACHING GAMES AND RELAYS**

The methods used in presenting a game depend upon many variables such as the age and size of the group playing the game, the type of game being played, available facilities, equipment, and supplies. The following are general suggestions to consider when presenting any game materials

### **CHOOSING GAMES OF LOW ORGANIZATION**

1. Choose games adapted to time, space, and weather conditions.
2. Choose a variety of types (circle games, line games, and relays).
3. Choose games that are varied in the amount of activity.
4. Choose games that allow all students to be involved at one time.

## **PRESENTING GAMES**

1. Have plans made in advance. Think through the games, have lines drawn, equipment ready, and other preplanning procedures completed.
2. Stand so the entire group can see and hear you. When talking to a line of children, ask those on the ends to move in to make a semicircle around you so all will be the same distance away and be able to hear equally well. Stand so the sun is to the back of the students.
3. Make explanations clear, brief, simple, and to the point. Demonstrate when possible instead of talking, or combine demonstrations with explanation. Remember the physical education period is essentially an activity period and the children want action.
4. If possible, have children facing away from the sun during explanations and when watching demonstrations. Look around at everyone in the group rather than at those just immediately in front of you.
5. Occasionally be "it" yourself, to get the game going quickly.
6. Correct outstanding faults but avoid fine details in the beginning to get the game going. Avoid stopping the game too frequently to make corrections. Give suggestions in a positive way.
7. Do not allow questions until after the students have played the game for a length of time to allow them to get a feel for the meaning of the game.
8. Have "squads" organized ahead of time. Avoid leaders picking squads. Use a system that will not present the situation of a child being chosen last. Count off by numbers, draw numbers/names from a hat, etc.
9. Plan special ways for handicapped children to take part.

## **SUPERVISING GAMES BEING PLAYED**

1. Have a definite signal for starting and stopping games. A hand signal is often better than a whistle for younger children. Have another signal for the class to gather near you for explanations and discussions. Demand instant attention to signals.
2. Circulate among all groups. Do not allow a few children to take up all your teaching time. Do not allow aggressive children to monopolize and control play.
3. Watch for fatigue. Guard against overexertion. Games being played outdoors should have frequent water breaks.
4. Keep your voice low and controlled. Be enthusiastic and radiate the spirit of fun. Give children a chance for discussion, but do not permit any talking while you are talking.
5. Anticipate difficulties so that accidents will be avoided. Make up special rules to guard against certain hazards. Stress safety rules and see that they are obeyed. Be sure that play surfaces are safe to use.
6. Do not allow undue roughness or other undesirable behavior. Impress on children that once decisions have made, they are final are to be accepted cheerfully and courteously.
7. After games are learned well, encourage children to make their own variations and to make suggestions for improvement of their play.
8. Join in the games occasionally. Do not make games too serious.
9. Comment on improvement. Encourage the poor players as well as praising the skillfu!.
10. Number one rule with the playing of games is to stop the game when the excitement is still fresh. Do not play a game till the children are bored and tired of it. By stopping it when the excitement is high, will result in children wanting to play the game again at some other time.

## **HINTS FOR TEACHING CLASSROOM GAMES**

1. Save indoor activities for inclement weather or for brief periods between other classroom activities.
2. Set all movable items out of the way. In rooms with immovable seats, adapt rules of games to prevent accidents.
3. Avoid having children run or change directions quickly because of lack of gym shoes on slippery floors.
4. Avoid games in which children may brush into hazardous obstacles.
5. Establish goal lines for early turning points several feet from walls or obstacles that than against them.
6. Use beanbags, balloons, or ball bladders rather than balls.
7. Alternate rows of children playing at time to avoid collisions.
8. Be sure children not playing at the time keep hands and feet out of aisles.
9. Do not throw objects toward windows.
10. Change rules of games to fit type of classroom being used.
11. Keep noise at a minimum.

## HINTS FOR TEACHING RELAYS

1. Teams should be small: five to six children on a team.
2. If teams are uneven, have one child run twice rather than have anyone not have a turn. Rotate the child that gets an extra turn so as not to favor the talented child all of the time.
3. A definite starting line and turning line should be established and should be understood by everyone before the relay is begun.
4. The most important things to be stressed are that (a) no player may cross the starting line until the previous runner has tagged him/her, and (b) every player must touch the turning line before returning to his/her team.
5. There should be a definite way of ending the relay such as raising hands or the whole team sitting down.
6. Tagging off the next runner should be done the same way for all relays.
7. Children should be used as starters and scorekeepers.
8. Vary the formation used.
9. Use relays for warm-ups, for practicing skills, or just for fun.
10. A practice round by walking through the relay first may help eliminate confusion when the relay is actually being played.

## **HINTS FOR TEACHING SKILL DRILLS AND LEAD-UP GAMES**

1. **Select skill drills that do not violate the rules or skills of the game itself.**
2. **Increase speed and distance gradually in skill drills.**
3. **Make all skill drills as nearly like the game situation.**
4. **Encourage children to decide for themselves on what they need special practice.**
5. **Frequent short periods of practice are better than long extended ones.**
6. **Make all skill drills into games that are fun.**
7. **In teaching a new skill, try to relate it to something already familiar.**
8. **Insist on good form. Do not be satisfied with indefinite, half-hearted efforts.**
9. **In teaching a new game formation, have a few players demonstrate and the rest watch until all understand. Some game formations and rotations can be taught by “walking through” the procedure until it is understood. This will alleviate the need to ask questions.**
10. **Avoid long explanations of rules before beginning to play. Give just enough of the essential rules to get started, and explain other rules as the need for them comes up in actual play. Again, hold questions until after the children have attempted to play the game.**
11. **Move about in such a way that all groups are within your field of vision.**
12. **Stress the importance of “team work” and that each child must “play his own position” in order not to interfere with others.**

## **GENERAL SUGGESTIONS FOR TEACHING PHYSICAL EDUCATION ACTIVITIES**

1. Have equipment ready. If possible, appoint leaders to help or give them full responsibility for equipment set up. Leaders should be rotated on a regular basis so as to insure that all children have an opportunity in being a leader.
2. Make any explanations for a game as short as possible and to the point. Get into formations quickly.
3. Develop necessary skills before trying the game.
4. Demonstrate so pupils with difficulty will get the idea.
5. Integrate isolated skills into a game as soon as possible. No class period should be devoted entirely to practicing isolated skills.
6. Build skill upon skill.
7. Warm-ups should pertain to the skills being used in the activity.
8. Never let an activity drag. When the children begin to lose interest, use a variation or change the activity.
9. Use sparingly those activities that allow only a few to participate at a time.
10. If an activity is a vigorous one, and the pupils begin to tire, switch to an activity that will permit time for recovery. Water breaks may also be necessary.
11. Use pupil leadership as much as possible; try to give all the pupils an equal opportunity to assume responsibility and to direct activities themselves.
12. Choose activities that relate to the season, weather, day, and interest.
13. Teams should be of equal ability.
14. Have degree of expectancy for each child and encourage them to do their best.
15. Employ teaching techniques that will help each child learn something new each day.
16. Work toward 100 percent participation throughout the class period.
17. Keep plans flexible; over plan rather than under plan.
18. Analyze classes that did not go well; realize the reasons may be your fault more often than not.
19. Correlate the activities with other school subjects.
20. Know the game yourself before you attempt to teach it.
21. Designate team membership by using color bands or pennies.
22. Once rules are established, they should be observed.
23. Discover in each child something in which he/she can excel.
24. Huddle the group together when attempting to talk to them.
25. Put the group into formation without wasting time.
26. When explaining an activity, be brief, clear, and concise and get to the point. Get the more important details across, and let the other points take care of themselves.
27. Do not accept questions until after a demonstration or until the game has been played at least once.
28. Minor faults can be corrected while the activity is in progress.
29. In team games encourage the loser, but be fair in all judgments.
30. Use different methods of choosing teams.

## **BENEFITS AND CONSEQUENCES**

Young people can build healthy bodies and establish healthy lifestyles by including physical activity in their daily lives. However, many young people in the CNMI are not physically active on a regular basis, and physical activity will decline dramatically during adolescence. School and community programs can help young people get and stay active by building and instilling a positive attitude toward being physically active for the recommended number of minutes per week. Instilling attitudes is why the CNMI Public School System should provide a dynamic and quality physical education program at every elementary school.

### **BENEFITS OF PHYSICAL ACTIVITY**

Promoting and providing quality, regular physical education programs in the Public School System in the CNMI for children and youth has the following benefits:

- Improves muscle strength and endurance
- Helps build healthy bones and muscles
- Helps control weight
- Reduces anxiety and stress
- Increases self-esteem
- May improve blood pressure and cholesterol levels
- Helps to build a better and more efficient cardiovascular system
- May help a person look better
- May help a person live longer
- Physically fit children achieve academically and socially better in school
- Decreases tardy and absenteeism
- Provides a foundation of learning and developing motor skills.

## **CONSEQUENCES OF PHYSICAL INACTIVITY**

**The long-term consequences of inactivity are very serious.**

**Inactivity and poor diet cause at least 300,000 deaths a year in the United States each year. In the CNMI, clearly 40% of all deaths are attributed to some form of cardiovascular/heart disease. Only tobacco use causes more preventable deaths in both the CNMI and the US.**

**Adults who are less active are at greater risk of dying of heart disease at a premature age and developing diabetes, colon cancer, and high blood pressure.**

**During childhood and adolescence, the effects of physical inactivity are evident. The percentage of young people who are overweight has more than doubled in the past 15 years. Clearly, 30 percent of all children are considered obese. The adage that an overweight child will most likely be overweight as an adult is true.**

## **PHYSICAL ACTIVITY AMONG YOUNG PEOPLE**

Almost half of the U.S. young people ages 6 to 21 do not participate in vigorous physical activity on a regular basis. No study has been performed in the CNMI to determine the percentage of students who are physically active on a regular basis.

More children are developing habits that lead to unhealthy lifestyles, watching more television, exercising less, and growing increasingly overweight. Participation in all types of activity declines noticeably as children and adolescents get older. The percentage of overweight young CNMI children has more than doubled in the past 30 years.

At the elementary level, it has been estimated that, in many school districts, such as the Public School System in the CNMI, as much as 80% of physical education is provided not by Physical Education specialists but by classroom teachers, who are not adequately prepared for the job. These teachers typically receive only a single course in elementary PE programming and lack the knowledge to plan and implement PE effectively.

Children should get at least 60 minutes of exercise each day. This would include at least 30 minutes in a scheduled physical education class, conducted by a trained physical education specialists or a trained classroom teacher, and the remaining 30 minutes could be derived from recess and lunchtime. Of the thirty minutes in a regular scheduled physical education class, some of the activity should last 10 to 15 minutes or more, mixed with brief periods of rest and recovery.

(Sammann, 1998)

## **PHYSICAL FITNESS**

1. **People of all ages, both male and female, benefit from regular physical activity.**
2. **Significant health benefits can be obtained by including a moderate amount of physical activity in one's daily life.**
3. **Additional health benefits are gained through greater amounts or intensities of physical activity.**
4. **Physical activity reduces the risk of premature mortality and of coronary heart disease, diabetes, hypertension, and colon cancer. PA also improves mental health and is important for the health of muscles, bones, and joints.**
5. **Children's Lifetime Physical Activity Model (C-LPAM)**
  - a. **Frequency – Daily – 3 or more each day**
  - b. **Intensity – Moderate –**
  - c. **Time – Duration of activity to expend at least 3 to 4 cal/lb/day.**
6. **Fitness Test**
  - a. **Personalized self-testing approach is student centered, concerned with the process of fitness testing, and places less emphasis on performance scores (product).**
  - b. **Personal best approach is for gifted performers and students who want to measure their maximal performance.**
7. **Awards**
  - a. **Base awards on achievement of goals that are challenging, yet attainable.**
  - b. **If fitness goals do not seem attainable to youngsters, "learned helplessness" sets in.**
  - c. **Can be viewed as a form of bribery**
  - d. **An alternative and long-term approach to awards is to recognize students for regular participation in activity.**

## PHYSICAL FITNESS TEST

Each student shall have their own individual card in which to record their scores for the following:

1. **Aerobic Capacity - One-mile run/walk.** Timed activity eight in a shuttle run or on a track. Other possible tests are the three-mile run/walk or the 12-minute walk/run. Enter time to the nearest whole second on card.
2. **Body Composition –** Body composition is evaluated using percent body fat, which is calculated by measuring the triceps and calf skinfolds or Body Mass Index (calculated using height and weight). Enter calculated index on card.
3. **Abdominal Strength – Curl-up.** Student lie in a supine position with the knees bent at a 140-degree angel. The hands are placed flat on the mat alongside the hips. Back is curled and chin is on chest to relieve pressure on the lower back. Enter number of repetitions on card.
4. **Upper Body Strength – Push-up.** Student is facing floor on both hands and feet (female students may also have knees touching floor). A successful push-up is counted when the arms are bent to a 90-degree angle. This item allows many more students to experience success as compared to the pull-up or flexed arm hang. Enter number of repetitions on card.
5. **Flexibility – Sit and Reach.** Students' feet are against a box with a ruler on the box between the student's legs. Ruler has the 9-inch mark on the edge of the box. Students reach along the ruler and a measurement is taken at the longest mark that students can reach. Enter number of inches, measured to the nearest half-inch, on card.

## RECOMMENDATIONS

This model includes 9 main recommendations for ensuring quality physical education programs, along with supporting recommendations for each.

1. **Policy:** Establish Public School System (PSS) Board of Education policies that promote enjoyable and lifelong physical activity among young people.
  - a. Require comprehensive, daily physical education for students in kindergarten through grade 12.
  - b. Require that adequate resources, including budget and facilities, be committed for physical education instruction and programs.
  - c. Require the hiring of physical education specialists to teach physical education in kindergarten through grade 12, elementary school teachers trained to teach health education, health education specialists to teach health education in middle and senior high schools, and to coach young people in after school interscholastic athletic programs.
  - d. Require that physical education instruction and programs meet the needs and interests of all students.
  
2. **Environment:** Provide physical and social environments that encourage and enable safe and enjoyable physical education.
  - a. Provide access to safe spaces and facilities for physical education in the school and the community.
  - b. Establish and enforce measures to prevent physical education-related injuries and illnesses.
  - c. Provide time within the school day for unstructured physical activity.
  - d. Discourage the use or withholding of physical activity as punishment.
  - e. Provide health promotion programs for school faculty and staff.
  
3. **Physical Education:** Implement physical education curricula and instruction that emphasize enjoyable participation in physical activities and that help students develop the knowledge, attitudes, motor skills, behavioral skills, and confidence needed to adopt and maintain physical active lifestyles.
  - a. Provide planned and sequential physical education curricula from kindergarten through grade 12 that promote enjoyable, lifelong physical education.
  - b. Use physical education curricula consistent with the national standards for physical education.
  - c. Use active learning strategies and emphasize enjoyable participation in physical education class.
  - d. Develop students' knowledge of and positive attitudes toward physical education.
  - e. Develop students' mastery of and confidence in motor and behavioral skills for participating in physical education.

- f. Provide a substantial percentage of each student's recommended weekly amount of physical activity in physical education classes.
  - g. Promote participation in enjoyable physical activity in the school, community, and home.
4. **Health education:** Implement health education curricula and instruction that help students develop the knowledge attitudes, behavioral skills and confidence needed to adopt and maintain physically active lifestyles.
- a. Promote collaboration among physical education, health education, and classroom teachers as well as teachers in related disciplines who plan and implement physical activity instruction.
  - b. Use active strategies to emphasize enjoyable participation in physical activity in the school, community and home.
  - c. Develop students' mastery of and confidence in the behavioral skills needed to adopt and maintain a healthy lifestyle that includes regular physical activity.
  - d. Encourage Public School System to hire a Certified Health Specialist to coordinate and oversee the elementary health education program.
5. **Extracurricular activities:** Provide extracurricular after-school interscholastic athletic programs that meet the needs and interests of all students.
- a. Provide a diversity of developmentally appropriate competitive and noncompetitive physical activity programs for all students.
  - b. Link students to community physical activity programs, and use community resources to support extracurricular physical activity programs.
6. **Parental involvement:** Include parents and guardians in physical education instruction and in extracurricular and community physical activity programs, and encourage them to support their children's participation in enjoyable physical activities.
- a. Encourage parents to advocate for quality physical education instruction and programs for their children.
  - b. Encourage parents to support their children's participation in appropriate, enjoyable physical activities.
  - c. Encourage parents to be physically active role models and to plan and participate in family activities that include physical activity.
7. **Personnel training:** Provide training for education, coaching, recreation, health care, and other school and community personnel that impart the knowledge and skills needed to effectively promote enjoyable, lifelong physical activity among young people.
- a. Train teachers through in-service training programs to deliver physical education that provides a substantial percentage of each student's recommended weekly amount of physical activity.
  - b. Train teachers to use active learning strategies needed to develop students'

knowledge about, attitudes toward, skills in, and confidence in engaging in physical activity.

- c. Train school and community personnel how to create psychosocial environments that enable young people to enjoy physical activity instruction and programs.
- d. Train school and community personnel how to involve parents and the community in physical activity instruction and programs the Northern Marianas College Health and Physical Education Department.
- e. Train volunteers whom coach sports and recreation programs for young people through the Northern Marianas College Health and Physical Education Department.
- f. Provide Associate of Arts, Bachelor of Arts and Master of Arts in Education with an emphasis in Physical Education through the Northern Marianas College. Note: (NMC already offers a BA in Education. This program will need to be expanded to include a physical education component.)

- 8. **Health Services:** Assess physical activity patterns among young people, counsel them about physical activity, and refer them to appropriate programs, an advocate for physical education instruction and programs for them.
  - a. Regularly assess the physical activity patterns of young people, reinforce physical activity among active young people, counsel inactive young people about physical activity, and refer young people to appropriate physical activity programs.
  - b. Advocate for school and community physical activity instruction and programs that meet the needs of young people.
- 9. **Evaluation:** Regularly evaluate school physical education instruction, programs, and facilities.
  - a. Evaluate the implementation, effectiveness and quality of physical education policies, curricula, instruction, programs, and personnel training.
  - b. Measure students' attainment of physical education knowledge, achievement of motor and behavioral skills, and adoption of healthy behaviors and lifestyles.

(Sammann, 1998)

## SUGGESTED ACTIVITIES FOR EACH DEVELOPMENTAL LEVEL

### Developmental Level I

#### Introductory (warm-up) activities

|                                |   |
|--------------------------------|---|
| European rhythmic running      | Individual running and changing movements   |
| Running and changing direction | Running and changing the type of locomotion |
| Running and stopping           |   |

#### Fitness and wellness activities

|                             |                       |
|-----------------------------|-----------------------|
| Fitness games and challenge | Four-corners movement |
| Fitness challenges          | Animal movements      |
| Parachute fitness           | Mini-challenge course |
| Circuit training            |                       |

#### Movement concepts and themes

|                                    |                     |
|------------------------------------|---------------------|
| Space awareness                    | Body awareness      |
| Qualities of movement              | Relationships       |
| Locomotor and non-locomotor skills | Manipulative skills |

#### Fundamental and manipulative motor skills

|                                      |                                      |
|--------------------------------------|--------------------------------------|
| Basic Mechanics of skill performance | Application of mechanical principles |
| Fundamental skills                   | Locomotor skills                     |

#### Rhythmic and dance movement skills

|                   |                    |
|-------------------|--------------------|
| Aerobic Dance     | Pease Porridge Hot |
| Skip to my Lou    | Children's Polka   |
| Chimes of Dunkirk | Hokey Pokey        |
| Grand March       | Ethnic Dances      |

#### Swimming/Gymnastic skills

|                          |              |
|--------------------------|--------------|
| Blowing bubbles          | Rolling Log  |
| Getting use to the water | Side Roll    |
| Floating                 | Forward Roll |
| Backward Curl            |              |

#### Low Organizational Games/Relays/Ethnic Activities

|              |                |
|--------------|----------------|
| Animal tag   | Cat and mice   |
| Change sides | Leap the brook |
| Red light    | Corner spy     |
| Relays       | Sneak Attack   |

## **Developmental Level II**

### **Introductory (warm-up) activities**

|                           |                           |
|---------------------------|---------------------------|
| Run and assume a pose     | Tortoise and hare         |
| Ponies in the stable      | High fives                |
| European rhythmic running | Adding Fitness challenges |

### **Fitness and wellness activities**

|                                   |                   |
|-----------------------------------|-------------------|
| Parachute fitness                 | Exercise to music |
| Stretching and jogging activities | Walk, trot, jog   |
| Challenge courses                 | Continuity drills |

### **Fundamental and manipulative motor skills**

|                                      |                                      |
|--------------------------------------|--------------------------------------|
| Basic Mechanics of skill performance | Application of mechanical principles |
| Fundamental skills                   | Locomotor skills                     |

### **Rhythmic and dance movement skills**

|                |                                       |
|----------------|---------------------------------------|
| Aerobic Dance  | La Raspa                              |
| Oh, Susana     | Troika                                |
| Square Dancing | Lummi Sticks/Stick Dance/Bamboo Dance |
| Bingo          | Virginia Reel                         |

### **Swimming/Gymnastic skills**

|                |               |
|----------------|---------------|
| Floating       | Forward Roll  |
| Front crawl    | Backward Roll |
| Frog Handstand | Cartwheel     |

### **Low Organizational Games/Relays/Ethnic Activities**

|                             |                  |
|-----------------------------|------------------|
| Nonda's Car Lot             | Relays           |
| Competitive Circle contests | Crows and cranes |
| Steal the treasure          |                  |

### **Sport skills**

|                 |               |
|-----------------|---------------|
| Volleyball      | Softball      |
| Basketball      | Soccer        |
| Track and Field | Cross Country |

## **Developmental Level III**

### **Introductory (warm-up) activities**

|                               |                      |
|-------------------------------|----------------------|
| Run, stop and pivot           | Triple S routine     |
| Upright movement to all fours | Secret movement      |
| Airplanes                     | Combination movement |
| Bridges by threes             | Leapfrog             |
| Fastest tag in the West       |                      |

### **Fitness and wellness activities**

|                          |                       |
|--------------------------|-----------------------|
| Teacher Leader exercises | Hexagon hustle        |
| Circuit training         | Astronaut drills      |
| Aerobic fitness          | Stretching activities |

### **Fundamental and manipulative motor skills**

|                     |                     |
|---------------------|---------------------|
| Fundamental skills  | Locomotor skills    |
| Nonlocomotor skills | Manipulative skills |

### **Rhythmic and dance movement skills**

|                          |               |
|--------------------------|---------------|
| Comin'Round the Mountain | Hora          |
| Virginia Reel            | Oh Johnny     |
| Limbo Rock               | Aerobic Dance |

### **Swimming/Gymnastic skills**

|                         |  |
|-------------------------|--|
| Basic swimming strokes  | Forward and backward roll combinations |
| Life-saving skills      | Back extension                         |
| Water-polo skills       | Headstand variations                   |
| Cartwheel and round off |  |

### **Low Organizational Games/Relays/Ethnic Activities**

|              |         |
|--------------|---------|
| Circle touch | Octopus |
| Whistle ball | Relays  |

### **Sport skills**

|                 |               |
|-----------------|---------------|
| Volleyball      | Softball      |
| Basketball      | Soccer        |
| Track and Field | Cross Country |
| Golf            | Tennis        |

(Sammann, 1998; Pangrazi, 1998; AAPPERD, 1999a; AAPHERD, 1999b)

## SUGGESTED DEVELOPMENTAL LEVEL I Yearly Activity Plan

| <b>Week</b> | <b>Fitness Development Activity</b> | <b>Lesson Focus Activity</b>               | <b>Game Activity</b>                                 |
|-------------|-------------------------------------|--|--|
| 1           | Teacher leader movement challenges  | Orientation Rhythms -1                     | Back to Back Whistle Mixer Grand March               |
| 2           | Hexagon Hustle                      | Manipulative and Fundamental skills - 1    | Wands and Hoops                                      |
| 3           | Stations                            | Manipulative and Fundamental skills - 2    | Locomotor Skills                                     |
| 4           | Hexagon Hustle                      | Physical Fitness - 1                       | Parachute  |
| 5           | Teacher leader exercises            | Manipulative and Fundamental skills - 3    | Playground balls                                     |
| 6           | Stations                            | Gymnastics -1                              | Rolling Log Side Roll                                |
| 7           | Stretching                          | Swimming - 1                               | Basic Breathing Skills                               |
| 8           | Curcuit Training                    | Swimming - 2                               | Basic Floating Skills                                |
| 9           | Astronaut drills                    | Gymnastics - 2                             | Partner Stunts Forward and Backward Rolls            |
| 10          | Aerobic Fitness                     | Manipulative and Fundamental skills - 4    | Jump Ropes Hula Hoops Fling-it                       |
| 11          | Aerobic Fitness                     | Low and Relays - 1 Recreational activities | Addition Tag Alaska Baseball Recreational Activities |
| 12          | Walk, jog, and run                  | Physical Fitness - 2                       | Walking and Jogging Skills                           |

|    |  |   |                                       |
|----|--|---|---------------------------------------|
| 13 | Challenge course fitness               | Rhythms - 2                             | Folk Dances                           |
| 14 | Walk, trot, and jog                    | Low and Relays - 2                      | Traditional Relays                    |
| 15 | Parachute fitness                      | Physical Fitness - 2                    | Aerobic Dance                         |
| 16 | Challenge Course                       | Low and Relays - 2                      | Jack-Rabbit Relay<br>Shuttle Relays   |
| 17 | Aerobic Fitness and Partner Resistance | Rhythms - 3                             | Square Dance                          |
| 18 | Challenge Course Challenge             | Physical Fitness - 3                    | Walk-Jog-Run                          |
| 19 | Exercise to music                      | Low and Relays -3                       | Previous Games                        |
| 20 | Exercise to music                      | Physical Fitness - 3                    | Circuit Training                      |
| 21 | Continuity Drills                      | Low and Relays - 4                      | Potato Shuttle Rela<br>Shuttle Relays |
| 22 | Aerobic Fitness                        | Rhythms - 4                             | Aerobic Dance                         |
| 23 | Continuity Drills                      | Manipulative and Fundamental skills - 6 | Steal the treasure<br>Trees           |
| 24 | Aerobic Fitness                        | Physical Fitness - 6                    | Obstacle Course                       |
| 25 | Exercise to music                      | Manipulative and Fundamental skills - 7 | Hula Hoops                            |

|    |                             |                      |   |
|----|-----------------------------|----------------------|---|
| 26 | Walk, jog, and run          | Physical Fitness - 4 | Obstacle Course                                       |
| 27 | Hexagon Hustle              | Physical Fitness - 5 | Aerobics &<br>Folk Dance                              |
| 28 | Parachute fitness           | Rhythms - 5          | Local Ethnic Dance                                    |
| 29 | Exercise to music           | Low and Relays - 6   | Leap the brook<br>Corner spy<br>Sneak Attack          |
| 30 | Circuit Training            | Physical Fitness - 6 | Beach ball<br>volleyball<br>Shower Service Ball       |
| 31 | Hexagon Hustle              | Movement - 5         | Space Awareness                                       |
| 32 | Continuity drills           | Low and Relays - 7   | Potato Shuttle Relay<br>Shuttle Relays                |
| 33 | Aerobic Fitness             | Physical Fitness - 7 | Throw it and Run<br>Two-pitch Softball<br>Hit and Run |
| 34 | Aerobic Fitness             | Rhythms - 6          | Beat Ball<br>Kick Softball<br>In a Pickle             |
| 35 | Parachute fitness           | Rhythms - 7          | Ethnic Folk Dance                                     |
| 36 | Teacher leader<br>exercises | Physical Fitness - 8 | Aerobic Dance   |

## SUGGESTED DEVELOPMENTAL LEVEL II Yearly Activity Plan

| <b>Week</b> | <b>Fitness Development Activity</b> | <b>Lesson Focus Activity</b>    | <b>Game Activity</b>  |
|-------------|-------------------------------------|---------------------------------|---|
| 1           | Teacher leader movement challenges  | Orientation Rhythms – 1         | Back to Back Whistle Mixer Grand March                            |
| 2           | Hexagon Hustle                      | Manipulative skills -1          | Using wands and hoops   |
| 3           | Teacher leader exercises            | Physical Fitness - 1            | Aerobic Dance   |
| 4           | Circuit Training                    | Physical Fitness - 2            | Parachute   |
| 5           | Hexagon Hustle                      | Manipulative skills - 2         | Locomotor Skills  |
| 6           | Circuit Training                    | Gymnastics                      | Forward Roll Backward Roll Frog Handstand                         |
| 7           | Stretching                          | Swimming                        | Floating Front Crawl  |
| 8           | Curcuit Training                    | Swimming                        | Back Stroke   |
| 9           | Astronaut drills                    | Gymnastics                      | Rolls Hand Stands Cartwheels Kips                                 |
| 10          | Aerobic Fitness                     | Sport Skills - 1 Soccer related | Soccer Touch Ball Diagonal Soccer Diagonal Soccer Circle kickball |
| 11          | Aerobic Fitness                     | Low and Relays Recreational - 1 | Bicycles Rollerblading Recreational Activities                    |
| 12          | Walk, jog, and run                  | Physical Fitness - 3            | Walking and Jogging   |

|    |  |                                     |  |
|----|--|-------------------------------------|--|
| 13 | Challenge course fitness               | Rhythms - 2                         | Folk Dances  |
| 14 | Walk, jog, and run                     | Rhythms -3                          | Square Dances  |
| 15 | Aerobic Fitness and partner resistance | Physical Fitness - 4                | Aerobic Dance  |
| 16 | Challenge Course                       | Low and Relays - 2                  | Jack-Rabbit Relay<br>Shuttle Relays                                  |
| 17 | Exercise to music                      | Sport Skills<br>Basketball - 2      | Birdie in the Cage<br>Dribblemania<br>Basketball Tag<br>Captain Ball |
| 18 | Aerobic Fitness and partner resistance | Physical Fitness - 5                | Obstacle Course  |
| 19 | Exercise to music                      | Physical Fitness - 6                | Aerobic Dance  |
| 20 | Stationary Stretches (Classroom)       | Wellness                            |  |
| 21 | Continuity Drills                      | Low and Relays - 3                  | Nonda's Car Lot<br>Crows and Cranes                                  |
| 22 | Continuity Drills                      | Rhythms - 4                         | Aerobic Dance  |
| 23 | Aerobic Fitness                        | Physical Fitness - 7                | Circuit Training   |
| 24 | Parachute fitness                      | Sport Skills - 3<br>Track and Field | Potato Shuttle Relay<br>Shuttle Relays<br>Sprint Starts              |
| 25 | Stretching activities                  | Low and Relays - 4                  | Circular relays<br>Shuttle Relays                                    |

|    |                             |  |   |
|----|-----------------------------|--|---|
| 26 | Walk, jog and run           | Low and Relays - 5                     | Steal the treasure<br>Trees                           |
| 27 | Parachute fitness           | Rhythms -5                             | Folk Dance  |
| 28 | Stations                    | Rhythms - 6                            | Local Ethnic Dance                                    |
| 29 | Exercise to music           | Sport Skills - 4<br>Volleyball related | Beach ball<br>volleyball<br>Informal Volleyball       |
| 30 | Circuit Training            | Sport Skills - 5<br>Volleyball related | Beach ball<br>volleyball<br>Shower Service Ball       |
| 31 | Hexagon Hustle              | Physical Fitness - 8                   | Aerobic Dance   |
| 32 | Continuity drills           | Low and Relays - 6                     | Precious Games  |
| 33 | Aerobic Fitness             | Sport Skills - 6<br>Softball related   | Throw it and Run<br>Two-pitch Softball<br>Hit and Run |
| 34 | Aerobic Fitness             | Physical Fitness - 9                   | Student created<br>Aerobic Dance                      |
| 35 | Parachute fitness           | Low and Relays - 7                     | Previous Games  |
| 36 | Teacher leader<br>exercises | Physical Fitness - 10                  | Walk-Jog-Run  |

## SUGGESTED DEVELOPMENTAL LEVEL III Yearly Activity Plan

| <b>Week</b> | <b>Fitness Development Activity</b> | <b>Lesson Focus Activity</b>                                  | <b>Game Activity</b>  |
|-------------|-------------------------------------|---|---|
| 1           | Teacher leader movement challenges  | Orientation<br>Rhythms – 1                                    | Back to Back<br>Whistle Mixer<br>Grand March                                |
| 2           | Hexagon Hustle                      | Sport Skills -1<br>Soccer                                     | Circle Kickball<br>Soccer Touch ball<br>Soccer Take-away<br>Diagonal Soccer |
| 3           | Teacher leader exercises            | Sport Skills -2<br>Soccer                                     | Game of Soccer  |
| 4           | Circuit Training                    | Physical Fitness - 1  | Aerobic Dance   |
| 5           | Classroom Stretches                 | Wellness  |   |
| 6           | Circuit Training                    | Fundamental skills - 1<br>using tug-o-war<br>ropes and relays |   |
| 7           | Stretching                          | Swimming - 1  | Basic Swimming Skills   |
| 8           | Curcuit Training                    | Swimming - 2  | Basic Swimming Skills   |
| 9           | Astronaut drills                    | Gymnastics -1   | Rolls and Hand Stand  |
| 10          | Aerobic Fitness                     | Gymnastics - 2  | Head Stand  |
| 11          | Aerobic Fitness                     | Low and Relays - 1<br>Recreational<br>Games                   | Bicycles<br>Rollerblades<br>Recreational Activities                         |
| 12          | Walk, jog, and run                  | Physical Fitness - 2  | Walking and jogging   |

|    |  |   |  |
|----|--|---|--|
| 13 | Challenge course fitness               | Rhythms - 4                                       | Folk Dances  |
| 14 | Walk, jog, and run                     | Rhythms -3  | Square Dances  |
| 15 | Aerobic Fitness and partner resistance | Physical Fitness - 3                              | Aerobic Dance  |
| 16 | Challenge Course                       | Low and Relays - 2                                | Jack-Rabbit Relay<br>Shuttle Relays                                  |
| 17 | Exercise to music                      | Sport Skills - 3<br>Basketball related activities | Birdie in the Cage<br>Dribblemania<br>Basketball Tag<br>Captain Ball |
| 18 | Aerobic Fitness and partner resistance | Sport Skills - 4<br>Basketball related activities | Captain Ball<br>Five Passes<br>Around the Key                        |
| 19 | Exercise to music (Classroom)          | Wellness - 4                                      |  |
| 20 | Stations                               | Fundamental skills - 2<br>using benches           |  |
| 21 | Continuity Drills                      | Low and Relays - 3                                | Relays   |
| 22 | Continuity Drills                      | Physical Fitness - 4                              | Aerobic Dance  |
| 23 | Aerobic Fitness                        | Recreational Skills - 4                           | Steal the treasure<br>Trees  |
| 24 | Parachute fitness                      | Sport Skills - 5<br>Track and Field               | Potato Shuttle Relay<br>Shuttle Relays                               |
| 25 | Aerobic Fitness                        | Sport Skills - 6<br>Track and Field               | Circular relays<br>Shuttle Relays<br>one-on-one contests             |

|    |                             |  |   |
|----|-----------------------------|--|---|
| 26 | Walk, jog and run           | Low and Relays - 5<br>Recreational Games | Bicycles and<br>Rollerblades                          |
| 27 | Parachute fitness           | Rhythms - 4                              | Aerobics<br>Folk Dance                                |
| 28 | Stations                    | Rhythms - 5                              | Local Ethnic Dance                                    |
| 29 | Exercise to music           | Sport Skills - 7<br>Volleyball related   | Beach ball<br>Informal Volleyball                     |
| 30 | Circuit Training            | Sport Skills - 8<br>Volleyball related   | Beach ball<br>Game of Volleyball                      |
| 31 | Hexagon Hustle              | Physical Fitness - 5                     | Aerobic Dance   |
| 32 | Continuity drills           | Physical Fitness - 6                     | Obstacle Course                                       |
| 33 | Aerobic Fitness             | Sport Skills - 9<br>Softball related     | Throw it and Run<br>Two-pitch Softball<br>Hit and Run |
| 34 | Aerobic Fitness             | Sport Skills - 10<br>Softball related    | Beat Ball<br>Kick Softball<br>In a Pickle             |
| 35 | Parachute fitness           | Physical Fitness - 7                     | Walk-Jog-Run  |
| 36 | Teacher leader<br>exercises | Physical Fitness - 8                     | Aerobic Dance   |

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## **APPENDIX C**

### **Letter to PSS To Request Permission To do Research**

**Letter to Commissioner of Public School System**

Dr. Rita H. Inos  
Commissioner of the Public School System  
Commonwealth of the Northern Mariana Islands  
Saipan, MP 96950

Dear Dr. Inos:

My name is Kurt Barnes and I am a long time resident of Saipan. I am a doctoral student at the University of San Diego, where I will earn my Ed. D. in Education Leadership. My dissertation is concerned with attitudes, knowledge, and practices of elementary school teachers toward the teaching of physical education.

I am requesting to do my research for my dissertation with the elementary school teachers on Saipan. The CNMI budget crisis has presented a situation where all specialists have been moved into the classroom as self-contained classroom teachers. Thus, the elementary teachers must now teach their own physical education.

I am requesting to present an in-service physical education training program for half of the elementary schools on Saipan. The in-service training program would last for eight weeks. All elementary schools would be administered a pre-test to assess each teacher's knowledge, attitudes, and practices toward the teaching of physical education. After the in-service training, the same test would be administered again to all teachers as a post-test. To complete the study, the practice section would be given after another eight weeks to evaluate if any change in practices has occurred.

If the above plan is favorable to you, please contact me as to the PSS administrator I should work with in order to set up the testing and training schedule.

Thank you for your consideration with the above request.

Sincerely,

Kurt C. Barnes

# **APPENDIX D**

## **Consent Form**

## CONSENT FORM

1. **Purpose of Study:** The main purpose of this study is to gather data on the attitudes, knowledge, and practices of elementary classroom teachers on Saipan in teaching physical education by using a model physical education program. Participants in both the control and treatment groups will fill out a pre-test, post-test, and post-post-test questionnaire. Treatment group participants will participate in a 16-hour workshop pertaining to effective methods of teaching elementary physical education. This workshop will run for eight weeks between the pre-test and first post-test.
2. There will be minimal risks to participants in this study. Proper stretching before and after each in-service session will eliminate the potential risk of sore muscles.
3. Participants will benefit from this study by increasing their knowledge, and improving their methods and techniques of teaching elementary physical education.
4. Participation in this study is strictly voluntarily. The decision not to take part in this study will in no way or manner jeopardize your job or status with the Public School System.
5. Prior to signing this consent form, you will be given an opportunity to ask questions.
6. This study should not continue beyond July of 2001.
7. Participants' identity on the pre-test and both post-tests will be confidential. Each participant will be given a code that will be used to label his or her pre-test, post-test and post post-test. This code will only be used to track the change in attitude, knowledge and practices and will only be known to the researcher. One year after the post post-test is administered, the tests will be destroyed.
8. The conditions of this study are clearly spelled out and there are no additional agreements, written or verbal, that could superimpose any of the above stated items.

I, the undersigned, understand the above explanations and, on that basis, I give consent to my voluntary participation in this research.

\_\_\_\_\_  
**Signature of Participant**

\_\_\_\_\_  
**Date**

Saipan, MP 9695  
**Location**

\_\_\_\_\_  
**Signature Principal Researcher**

\_\_\_\_\_  
**Date**

# **APPENDIX E**

**Results from the**

**Attitude Section**

**of the**

**Questionnaire**

**Chart E1****Attitude Scores Averages by School (Pre-test Scores in Relation to Post-test Scores)**

| <b>Name of School</b> | <b>Treatment Group</b> |             |               | <b>Control Group</b> |             |               |
|-----------------------|------------------------|-------------|---------------|----------------------|-------------|---------------|
|                       | <b>Pre</b>             | <b>Post</b> | <b>Change</b> | <b>Pre</b>           | <b>Post</b> | <b>Change</b> |
| Oleai                 | 67.0                   | 68.8        | 1.8           |                      |             |               |
| San Vicente           | 68.8                   | 69.4        | 0.6           |                      |             |               |
| Kagman                | 69.2                   | 70.3        | 1.1           |                      |             |               |
| Koblerville           | 65.8                   | 68.2        | 2.4           |                      |             |               |
| Tanapag               | 72.3                   | 72.1        | -0.2          |                      |             |               |
| San Antonio           |                        |             |               | 68.9                 | 67.9        | -1.0          |
| G. T Camacho          |                        |             |               | 66.6                 | 65.9        | -0.7          |
| William S. Reyes      |                        |             |               | 68.2                 | 68.0        | -0.2          |
| Dan-Dan               |                        |             |               | 63.4                 | 66.0        | 2.6           |
| <b>Averages</b>       | <b>68.4</b>            | <b>69.6</b> | <b>1.2</b>    | <b>67.0</b>          | <b>67.1</b> | <b>0.1</b>    |

Chart E2

## Pre-Test Attitude Scores for Treatment Group

| Statement | Strongly Disagree/<br>Disagree |      | Neutral |      | Strongly Agree/<br>Agree |      |
|-----------|--------------------------------|------|---------|------|--------------------------|------|
|           | Resp                           | %    | Resp    | %    | Resp                     | %    |
| 1         | 14                             | 14.6 | 18      | 18.8 | 64                       | 66.7 |
| 2         | 31                             | 32.3 | 23      | 24.0 | 42                       | 43.8 |
| 3         | 1                              | 1.0  | 8       | 8.3  | 87                       | 90.6 |
| 4         | 13                             | 13.5 | 19      | 19.8 | 64                       | 66.7 |
| 5         | 26                             | 27.1 | 30      | 31.3 | 40                       | 41.7 |
| 6         | 12                             | 12.5 | 11      | 11.5 | 73                       | 76.0 |
| 7         | 40                             | 41.7 | 29      | 30.2 | 27                       | 28.1 |
| 8         | 28                             | 29.2 | 26      | 27.1 | 42                       | 43.8 |
| 9         | 1                              | 1.0  | 5       | 5.2  | 90                       | 93.8 |
| 10        | 8                              | 8.3  | 9       | 9.4  | 79                       | 82.3 |
| 11        | 69                             | 71.9 | 20      | 20.8 | 7                        | 7.3  |
| 12        | 4                              | 4.2  | 21      | 21.9 | 71                       | 74.0 |
| 13        | 63                             | 65.6 | 21      | 21.9 | 12                       | 12.5 |
| 14        | 49                             | 51.0 | 18      | 18.8 | 29                       | 30.2 |
| 15        | 7                              | 7.3  | 5       | 5.2  | 84                       | 87.5 |
| 16        | 5                              | 5.2  | 13      | 13.5 | 78                       | 81.3 |
| 17        | 50                             | 52.1 | 20      | 20.8 | 26                       | 27.1 |
| 18        | 5                              | 5.2  | 18      | 18.8 | 73                       | 76.0 |
| 19        | 34                             | 35.4 | 27      | 28.1 | 35                       | 36.5 |
| 20        | 67                             | 69.8 | 15      | 15.6 | 14                       | 14.6 |

## Chart E3

## Post-Test Attitude Scores for Treatment Group

| Statement | Strongly Disagree/<br>Disagree |      | Neutral |      | Strongly Agree/<br>Agree |      |
|-----------|--------------------------------|------|---------|------|--------------------------|------|
|           | Resp                           | %    | Resp    | %    | Resp                     | %    |
| 1         | 3                              | 3.1  | 15      | 15.6 | 78                       | 81.3 |
| 2         | 29                             | 30.2 | 23      | 22.9 | 45                       | 46.9 |
| 3         | 1                              | 1.0  | 4       | 4.3  | 91                       | 94.8 |
| 4         | 5                              | 5.2  | 23      | 24.0 | 68                       | 70.8 |
| 5         | 24                             | 25.0 | 22      | 22.9 | 50                       | 52.1 |
| 6         | 15                             | 15.6 | 13      | 13.5 | 68                       | 70.8 |
| 7         | 29                             | 30.2 | 41      | 42.7 | 26                       | 27.1 |
| 8         | 26                             | 27.1 | 26      | 27.1 | 44                       | 45.8 |
| 9         | 2                              | 2.1  | 6       | 6.3  | 88                       | 91.7 |
| 10        | 7                              | 7.3  | 7       | 7.3  | 82                       | 85.4 |
| 11        | 70                             | 72.9 | 13      | 13.5 | 13                       | 13.5 |
| 12        | 5                              | 5.2  | 14      | 14.6 | 77                       | 80.2 |
| 13        | 69                             | 71.9 | 20      | 20.8 | 7                        | 7.3  |
| 14        | 49                             | 51.0 | 28      | 29.2 | 19                       | 19.8 |
| 15        | 1                              | 1.0  | 14      | 14.6 | 81                       | 84.4 |
| 16        | 2                              | 2.1  | 5       | 5.2  | 89                       | 92.7 |
| 17        | 41                             | 42.7 | 24      | 25.0 | 31                       | 32.3 |
| 18        | 6                              | 6.3  | 27      | 28.1 | 63                       | 65.6 |
| 19        | 43                             | 44.8 | 33      | 34.4 | 20                       | 20.8 |
| 20        | 63                             | 65.6 | 18      | 18.8 | 15                       | 15.6 |

Chart E4

## Pre-Test Attitude Scores for Control Group

| Statement | Strongly Disagree/<br>Disagree |      | Neutral |      | Strongly Agree/<br>Agree |      |
|-----------|--------------------------------|------|---------|------|--------------------------|------|
|           | Resp                           | %    | Resp    | %    | Resp                     | %    |
| 1         | 15                             | 19.5 | 29      | 37.7 | 33                       | 42.9 |
| 2         | 40                             | 51.9 | 17      | 22.1 | 20                       | 26.0 |
| 3         | 1                              | 1.3  | 5       | 6.5  | 71                       | 92.2 |
| 4         | 13                             | 16.9 | 25      | 32.5 | 39                       | 50.6 |
| 5         | 36                             | 46.8 | 13      | 16.9 | 28                       | 36.4 |
| 6         | 7                              | 9.1  | 7       | 9.1  | 63                       | 81.8 |
| 7         | 29                             | 37.7 | 33      | 42.9 | 15                       | 19.5 |
| 8         | 25                             | 32.5 | 27      | 35.1 | 25                       | 32.5 |
| 9         | 1                              | 1.3  | 6       | 7.8  | 70                       | 90.9 |
| 10        | 6                              | 7.8  | 8       | 10.4 | 63                       | 81.8 |
| 11        | 62                             | 80.5 | 10      | 13.0 | 5                        | 6.5  |
| 12        | 0                              | 0.0  | 16      | 20.8 | 61                       | 79.2 |
| 13        | 51                             | 66.2 | 16      | 20.8 | 10                       | 13.0 |
| 14        | 46                             | 59.7 | 15      | 19.5 | 16                       | 20.8 |
| 15        | 4                              | 5.2  | 12      | 15.6 | 61                       | 79.2 |
| 16        | 1                              | 1.3  | 12      | 15.6 | 64                       | 83.1 |
| 17        | 35                             | 45.5 | 12      | 15.6 | 30                       | 39.0 |
| 18        | 7                              | 9.1  | 9       | 11.7 | 61                       | 79.2 |
| 19        | 23                             | 29.9 | 23      | 29.9 | 31                       | 40.3 |
| 20        | 57                             | 74.0 | 7       | 9.1  | 13                       | 16.9 |

## Chart E5

## Post-Test Attitude Scores for Control Group

| Statement | Strongly Disagree/<br>Disagree |      | Neutral |      | Strongly Agree/<br>Agree |      |
|-----------|--------------------------------|------|---------|------|--------------------------|------|
|           | Resp                           | %    | Resp    | %    | Resp                     | %    |
| 1         | 8                              | 10.4 | 26      | 33.8 | 43                       | 55.8 |
| 2         | 46                             | 59.7 | 12      | 15.6 | 19                       | 24.7 |
| 3         | 0                              | 0.0  | 5       | 6.5  | 72                       | 93.5 |
| 4         | 17                             | 22.1 | 23      | 29.9 | 37                       | 48.1 |
| 5         | 32                             | 41.6 | 17      | 22.1 | 28                       | 36.4 |
| 6         | 5                              | 6.5  | 8       | 10.4 | 64                       | 83.1 |
| 7         | 26                             | 33.8 | 36      | 46.8 | 15                       | 19.5 |
| 8         | 19                             | 24.7 | 29      | 37.7 | 29                       | 37.7 |
| 9         | 2                              | 2.6  | 6       | 7.8  | 69                       | 89.6 |
| 10        | 5                              | 6.5  | 10      | 13.0 | 62                       | 80.5 |
| 11        | 62                             | 80.5 | 10      | 13.0 | 5                        | 6.5  |
| 12        | 3                              | 3.9  | 16      | 20.8 | 57                       | 74.0 |
| 13        | 49                             | 63.6 | 16      | 20.8 | 7                        | 9.1  |
| 14        | 43                             | 55.8 | 15      | 19.5 | 19                       | 24.7 |
| 15        | 2                              | 2.6  | 13      | 16.9 | 62                       | 80.5 |
| 16        | 1                              | 1.3  | 11      | 14.3 | 65                       | 84.4 |
| 17        | 40                             | 51.9 | 12      | 15.6 | 25                       | 32.5 |
| 18        | 8                              | 10.4 | 16      | 20.8 | 53                       | 68.8 |
| 19        | 29                             | 37.7 | 18      | 23.4 | 30                       | 39.0 |
| 20        | 49                             | 63.6 | 11      | 14.3 | 17                       | 22.1 |

**APPENDIX F**

**Results from the**

**Practice Section**

**of the**

**Questionnaire**

Chart F1**Average of Practice Scores by Schools (Pre-test Scores in Relation to Post-test-2 Scores)**

| Name of School   | Treatment Group |             |            | Control Group |             |            |
|------------------|-----------------|-------------|------------|---------------|-------------|------------|
|                  | Pre             | Post        | Change     | Pre           | Post        | Change     |
| Oleai            | 60.4            | 60.2        | -0.2       |               |             |            |
| San Vicente      | 64.2            | 70.9        | 6.7        |               |             |            |
| Kagman           | 68.1            | 70.3        | 2.2        |               |             |            |
| Koblerville      | 67.4            | 73.3        | 10.1       |               |             |            |
| Tanapag          | 74.9            | 75.5        | 0.6        |               |             |            |
| San Antonio      |                 |             |            | 75.9          | 81.1        | 5.2        |
| G. T Camacho     |                 |             |            | 63.1          | 57.6        | -5.4       |
| William S. Reyes |                 |             |            | 55.9          | 54.3        | -1.6       |
| Dan-Dan          |                 |             |            | 63.7          | 70.4        | 6.7        |
| <b>Averages</b>  | <b>66.3</b>     | <b>70.1</b> | <b>3.8</b> | <b>63.4</b>   | <b>63.9</b> | <b>0.5</b> |

## Chart F2

## Pre-Test Practice Scores for Treatment Group

| Statement | Strongly Disagree/<br>Disagree |      | Neutral |      | Strongly Agree/<br>Agree |      |
|-----------|--------------------------------|------|---------|------|--------------------------|------|
|           | Resp                           | %    | Resp    | %    | Resp                     | %    |
| 1         | 28                             | 29.2 | 19      | 19.8 | 49                       | 51.0 |
| 2         | 41                             | 42.7 | 17      | 17.7 | 38                       | 39.6 |
| 3         | 32                             | 33.3 | 15      | 15.6 | 49                       | 51.0 |
| 4         | 33                             | 34.4 | 19      | 19.8 | 44                       | 45.8 |
| 5         | 26                             | 27.1 | 21      | 21.9 | 49                       | 51.0 |
| 6         | 29                             | 30.2 | 21      | 21.9 | 46                       | 47.9 |
| 7         | 22                             | 22.9 | 18      | 18.8 | 56                       | 58.3 |
| 8         | 17                             | 17.7 | 19      | 19.8 | 60                       | 62.5 |
| 9         | 17                             | 17.7 | 21      | 21.9 | 58                       | 60.4 |
| 10        | 23                             | 24.0 | 23      | 24.0 | 50                       | 52.1 |
| 11        | 16                             | 16.7 | 13      | 13.5 | 67                       | 69.8 |
| 12        | 19                             | 19.8 | 16      | 16.7 | 61                       | 63.5 |
| 13        | 33                             | 34.4 | 21      | 21.9 | 42                       | 43.8 |
| 14        | 27                             | 28.1 | 23      | 24.0 | 46                       | 47.9 |
| 15        | 26                             | 27.1 | 18      | 18.8 | 52                       | 54.2 |
| 16        | 24                             | 25.0 | 32      | 33.3 | 40                       | 41.7 |
| 17        | 21                             | 21.9 | 20      | 20.8 | 55                       | 57.3 |
| 18        | 22                             | 22.9 | 20      | 20.8 | 54                       | 56.3 |
| 19        | 38                             | 39.6 | 27      | 28.1 | 31                       | 32.3 |
| 20        | 34                             | 35.4 | 16      | 16.7 | 46                       | 47.9 |

## Chart E3

## Post-Test Practice Scores for Treatment Group

| Statement | Strongly Disagree/<br>Disagree |      | Neutral |      | Strongly Agree/<br>Agree |      |
|-----------|--------------------------------|------|---------|------|--------------------------|------|
|           | Resp                           | %    | Resp    | %    | Resp                     | %    |
| 1         | 15                             | 15.6 | 26      | 27.1 | 55                       | 57.3 |
| 2         | 28                             | 29.2 | 33      | 34.4 | 35                       | 36.5 |
| 3         | 19                             | 19.8 | 20      | 20.8 | 57                       | 59.4 |
| 4         | 21                             | 21.9 | 33      | 34.4 | 42                       | 43.8 |
| 5         | 9                              | 9.4  | 33      | 34.4 | 54                       | 56.3 |
| 6         | 19                             | 19.8 | 36      | 37.5 | 41                       | 42.7 |
| 7         | 13                             | 13.5 | 26      | 27.1 | 57                       | 59.4 |
| 8         | 17                             | 17.7 | 25      | 26.0 | 54                       | 56.3 |
| 9         | 10                             | 10.4 | 27      | 26.1 | 59                       | 61.5 |
| 10        | 27                             | 28.1 | 24      | 25.0 | 45                       | 46.9 |
| 11        | 10                             | 10.4 | 24      | 25.0 | 62                       | 64.6 |
| 12        | 8                              | 8.3  | 28      | 29.2 | 60                       | 62.5 |
| 13        | 17                             | 17.7 | 36      | 37.5 | 43                       | 44.8 |
| 14        | 14                             | 14.6 | 34      | 35.4 | 48                       | 50.0 |
| 15        | 21                             | 21.9 | 31      | 32.3 | 44                       | 45.8 |
| 16        | 17                             | 17.7 | 31      | 32.3 | 48                       | 50.0 |
| 17        | 14                             | 14.6 | 20      | 20.8 | 62                       | 64.6 |
| 18        | 16                             | 16.7 | 28      | 29.2 | 52                       | 54.2 |
| 19        | 21                             | 21.9 | 37      | 38.5 | 38                       | 39.6 |
| 20        | 30                             | 31.3 | 24      | 25.0 | 42                       | 43.8 |

## Chart E4

## Pre-Test Practice Scores for Control Group

| Statement | Strongly Disagree/<br>Disagree |      | Neutral |      | Strongly Agree/<br>Agree |      |
|-----------|--------------------------------|------|---------|------|--------------------------|------|
|           | Resp                           | %    | Resp    | %    | Resp                     | %    |
| 1         | 35                             | 45.5 | 17      | 22.1 | 25                       | 32.5 |
| 2         | 42                             | 54.5 | 17      | 22.1 | 18                       | 23.4 |
| 3         | 33                             | 42.9 | 20      | 26.0 | 24                       | 31.2 |
| 4         | 33                             | 42.9 | 16      | 20.8 | 28                       | 36.4 |
| 5         | 22                             | 28.6 | 16      | 20.8 | 39                       | 50.6 |
| 6         | 26                             | 33.8 | 18      | 23.4 | 33                       | 42.9 |
| 7         | 20                             | 26.0 | 17      | 22.1 | 40                       | 51.9 |
| 8         | 21                             | 27.3 | 13      | 16.9 | 43                       | 55.8 |
| 9         | 17                             | 22.1 | 15      | 19.5 | 45                       | 58.4 |
| 10        | 22                             | 26.6 | 21      | 27.3 | 34                       | 44.2 |
| 11        | 18                             | 23.4 | 14      | 18.2 | 45                       | 58.4 |
| 12        | 19                             | 24.7 | 16      | 20.8 | 42                       | 54.5 |
| 13        | 24                             | 31.2 | 23      | 29.9 | 30                       | 39.0 |
| 14        | 14                             | 18.2 | 25      | 32.5 | 38                       | 49.4 |
| 15        | 20                             | 26.0 | 23      | 29.9 | 34                       | 44.2 |
| 16        | 20                             | 26.0 | 22      | 28.6 | 35                       | 45.5 |
| 17        | 16                             | 20.8 | 9       | 11.7 | 52                       | 67.5 |
| 18        | 19                             | 24.7 | 15      | 19.5 | 43                       | 55.8 |
| 19        | 24                             | 31.2 | 26      | 33.8 | 25                       | 32.5 |
| 20        | 27                             | 35.1 | 17      | 22.1 | 33                       | 42.9 |

## Chart F5

## Post-Test Practice Scores for Control Group

| Statement | Strongly Disagree/<br>Disagree |      | Neutral |      | Strongly Agree/<br>Agree |      |
|-----------|--------------------------------|------|---------|------|--------------------------|------|
|           | Resp                           | %    | Resp    | %    | Resp                     | %    |
| 1         | 32                             | 41.6 | 19      | 24.7 | 26                       | 33.8 |
| 2         | 38                             | 49.4 | 22      | 28.6 | 17                       | 22.1 |
| 3         | 33                             | 42.9 | 19      | 24.7 | 25                       | 32.5 |
| 4         | 28                             | 36.4 | 17      | 22.1 | 32                       | 41.6 |
| 5         | 26                             | 33.8 | 18      | 23.4 | 33                       | 42.9 |
| 6         | 30                             | 39.0 | 20      | 26.0 | 27                       | 35.1 |
| 7         | 19                             | 24.7 | 14      | 18.2 | 44                       | 57.1 |
| 8         | 15                             | 19.5 | 18      | 23.4 | 44                       | 57.1 |
| 9         | 17                             | 22.1 | 18      | 23.4 | 42                       | 54.5 |
| 10        | 33                             | 42.9 | 13      | 16.9 | 31                       | 40.3 |
| 11        | 17                             | 22.1 | 10      | 13.0 | 50                       | 64.9 |
| 12        | 22                             | 28.6 | 19      | 24.7 | 36                       | 46.8 |
| 13        | 21                             | 27.3 | 23      | 29.9 | 33                       | 42.9 |
| 14        | 17                             | 22.1 | 19      | 24.7 | 41                       | 53.2 |
| 15        | 16                             | 20.8 | 16      | 20.8 | 45                       | 58.4 |
| 16        | 16                             | 20.8 | 24      | 31.2 | 37                       | 48.1 |
| 17        | 13                             | 16.9 | 11      | 14.3 | 53                       | 68.8 |
| 18        | 15                             | 19.5 | 16      | 20.8 | 46                       | 59.7 |
| 19        | 23                             | 29.9 | 26      | 33.8 | 26                       | 36.4 |
| 20        | 24                             | 31.2 | 21      | 27.3 | 32                       | 41.6 |

Chart E6**Post-Post-Test Practice Scores for Treatment Group**

| <b>Statement</b> | <b>Strongly Disagree/<br/>Disagree</b> |          | <b>Neutral</b> |          | <b>Strongly Agree/<br/>Agree</b> |          |
|------------------|--|----------|----------------|----------|----------------------------------|----------|
|                  | <b>Resp</b>                            | <b>%</b> | <b>Resp</b>    | <b>%</b> | <b>Resp</b>                      | <b>%</b> |
| 1                | 15                                     | 15.6     | 24             | 25.0     | 57                               | 59.4     |
| 2                | 27                                     | 28.1     | 30             | 31.3     | 39                               | 40.6     |
| 3                | 18                                     | 18.8     | 18             | 18.8     | 60                               | 62.5     |
| 4                | 21                                     | 21.9     | 30             | 31.3     | 45                               | 46.9     |
| 5                | 13                                     | 13.5     | 31             | 32.3     | 52                               | 54.2     |
| 6                | 17                                     | 17.7     | 41             | 42.7     | 38                               | 39.6     |
| 7                | 12                                     | 12.5     | 22             | 22.9     | 62                               | 64.6     |
| 8                | 11                                     | 11.5     | 24             | 25.0     | 61                               | 63.5     |
| 9                | 11                                     | 11.5     | 22             | 22.9     | 63                               | 65.6     |
| 10               | 26                                     | 27.1     | 23             | 24.0     | 47                               | 49.0     |
| 11               | 7                                      | 7.3      | 20             | 20.8     | 69                               | 71.9     |
| 12               | 10                                     | 10.4     | 21             | 21.9     | 65                               | 67.7     |
| 13               | 19                                     | 19.8     | 33             | 34.4     | 44                               | 45.8     |
| 14               | 14                                     | 14.6     | 27             | 28.1     | 55                               | 57.3     |
| 15               | 18                                     | 18.8     | 26             | 27.1     | 52                               | 54.2     |
| 16               | 19                                     | 19.8     | 26             | 27.1     | 51                               | 53.1     |
| 17               | 11                                     | 11.5     | 16             | 16.7     | 69                               | 71.9     |
| 18               | 14                                     | 14.6     | 26             | 27.1     | 56                               | 58.3     |
| 19               | 24                                     | 25.0     | 30             | 31.3     | 42                               | 43.8     |
| 20               | 30                                     | 31.3     | 22             | 22.9     | 44                               | 45.8     |

Chart E7

## Post-Post-Test Practice Scores for Control Group

| Statement | Strongly Disagree/<br>Disagree |      | Neutral |      | Strongly Agree/<br>Agree |      |
|-----------|--------------------------------|------|---------|------|--------------------------|------|
|           | Resp                           | %    | Resp    | %    | Resp                     | %    |
| 1         | 31                             | 40.3 | 20      | 26.0 | 26                       | 33.8 |
| 2         | 37                             | 48.1 | 22      | 28.6 | 18                       | 23.4 |
| 3         | 32                             | 41.6 | 19      | 24.7 | 26                       | 33.8 |
| 4         | 28                             | 36.4 | 19      | 24.7 | 30                       | 39.0 |
| 5         | 24                             | 31.2 | 18      | 23.4 | 35                       | 45.5 |
| 6         | 28                             | 36.4 | 20      | 26.0 | 29                       | 37.7 |
| 7         | 19                             | 24.7 | 14      | 18.2 | 44                       | 57.1 |
| 8         | 18                             | 23.4 | 18      | 23.4 | 41                       | 53.2 |
| 9         | 18                             | 23.4 | 20      | 26.0 | 39                       | 50.6 |
| 10        | 35                             | 45.5 | 12      | 15.6 | 30                       | 39.0 |
| 11        | 18                             | 23.4 | 9       | 11.7 | 50                       | 64.9 |
| 12        | 24                             | 31.2 | 14      | 18.2 | 39                       | 50.6 |
| 13        | 22                             | 28.6 | 25      | 32.5 | 31                       | 40.3 |
| 14        | 19                             | 24.7 | 15      | 19.5 | 43                       | 55.8 |
| 15        | 16                             | 20.8 | 16      | 20.8 | 45                       | 58.4 |
| 16        | 16                             | 20.8 | 26      | 33.8 | 35                       | 45.5 |
| 17        | 15                             | 19.5 | 11      | 14.3 | 51                       | 66.2 |
| 18        | 17                             | 22.1 | 13      | 16.9 | 47                       | 61.0 |
| 19        | 25                             | 32.5 | 25      | 32.5 | 27                       | 35.1 |
| 20        | 25                             | 32.5 | 21      | 27.3 | 31                       | 40.3 |

# **APPENDIX G**

## **Results from the Knowledge Section of the Questionnaire**

**Chart G1****Averages of Knowledge Scores by School (Pre-test Scores in Relation to Post-test Scores)**

| <b>Name of School</b> | <b>Treatment Group</b> |             |               | <b>Control Group</b> |             |               |
|-----------------------|------------------------|-------------|---------------|----------------------|-------------|---------------|
|                       | <b>Pre</b>             | <b>Post</b> | <b>Change</b> | <b>Pre</b>           | <b>Post</b> | <b>Change</b> |
| Oleai                 | 21.7                   | 31.8        | 10.1          |                      |             |               |
| San Vicente           | 22.7                   | 28.2        | 5.6           |                      |             |               |
| Kagman                | 24.1                   | 29.6        | 5.6           |                      |             |               |
| Koblerville           | 23.2                   | 27.2        | 4.0           |                      |             |               |
| Tanapag               | 18.0                   | 22.8        | 4.8           |                      |             |               |
| San Antonio           |                        |             |               | 25.3                 | 24.8        | -0.5          |
| G. T Camacho          |                        |             |               | 25.5                 | 23.7        | -1.8          |
| William S. Reyes      |                        |             |               | 22.9                 | 23.2        | 0.3           |
| Dan-Dan               |                        |             |               | 25.1                 | 25.6        | 0.5           |
| <b>Averages</b>       | <b>22.0</b>            | <b>28.3</b> | <b>6.3</b>    | <b>24.4</b>          | <b>23.8</b> | <b>-0.6</b>   |

Chart G2

Averages of Knowledge Scores by Question for Treatment Group (Pre-test Scores in Relation to Post-test Scores)

|     | PRE |      | POST |      | DIFF |       | PER |   |      | PRE |      | POST |      | DIFF |       | PER |   |
|-----|-----|------|------|------|------|-------|-----|---|------|-----|------|------|------|------|-------|-----|---|
|     | Cor | %    | Cor  | %    | Cor  | %     | Cor | % |      | Cor | %    | Cor  | %    | Cor  | %     | Cor | % |
| 1D  | 40  | 41.7 | 74   | 77.1 | 34   | 85.0  |     |   | 21 B | 87  | 90.6 | 89   | 92.7 | 2    | 2.3   |     |   |
| 2A  | 55  | 57.3 | 77   | 80.2 | 22   | 40.0  |     |   | 22 B | 33  | 34.4 | 48   | 50.0 | 15   | 45.5  |     |   |
| 3A  | 44  | 45.8 | 59   | 61.5 | 15   | 34.1  |     |   | 23 A | 62  | 64.6 | 78   | 81.3 | 16   | 25.8  |     |   |
| 4A  | 85  | 88.5 | 86   | 89.6 | 1    | 1.2   |     |   | 24 B | 13  | 13.5 | 66   | 68.8 | 53   | 407.7 |     |   |
| 5B  | 54  | 56.3 | 64   | 66.7 | 10   | 18.5  |     |   | 25 C | 19  | 19.8 | 37   | 38.5 | 18   | 94.7  |     |   |
| 6D  | 72  | 75.0 | 77   | 80.2 | 5    | 6.9   |     |   | 26 D | 81  | 84.4 | 87   | 90.6 | 6    | 7.4   |     |   |
| 7C  | 72  | 75.0 | 82   | 85.4 | 10   | 13.9  |     |   | 27 A | 40  | 41.7 | 71   | 74.0 | 31   | 77.5  |     |   |
| 8A  | 66  | 68.8 | 33   | 34.4 | -33  | -50.0 |     |   | 28 A | 76  | 79.2 | 67   | 69.8 | -9   | -11.8 |     |   |
| 9C  | 9   | 9.4  | 53   | 55.2 | 44   | 488.9 |     |   | 29 A | 28  | 29.2 | 52   | 54.2 | 24   | 85.7  |     |   |
| 10D | 87  | 90.6 | 92   | 95.8 | 5    | 5.7   |     |   | 30 D | 22  | 22.9 | 42   | 43.8 | 20   | 90.9  |     |   |
| 11C | 75  | 78.1 | 79   | 82.3 | 4    | 5.3   |     |   | 31 C | 59  | 61.5 | 60   | 62.5 | 1    | 1.7   |     |   |
| 12B | 30  | 31.3 | 62   | 64.6 | 32   | 106.7 |     |   | 32 B | 77  | 80.2 | 87   | 90.6 | 10   | 13.0  |     |   |
| 13C | 48  | 50.0 | 72   | 75.0 | 24   | 50.0  |     |   | 33 D | 48  | 50.0 | 65   | 67.7 | 17   | 35.4  |     |   |
| 14B | 45  | 46.9 | 59   | 61.5 | 14   | 31.1  |     |   | 34 C | 66  | 68.8 | 80   | 83.3 | 14   | 21.2  |     |   |
| 15A | 63  | 65.6 | 75   | 78.1 | 12   | 19.0  |     |   | 35 D | 51  | 53.1 | 53   | 55.2 | 2    | 3.9   |     |   |
| 16D | 85  | 88.5 | 86   | 89.6 | 1    | 1.2   |     |   | 36 B | 54  | 56.3 | 56   | 58.3 | 2    | 3.7   |     |   |
| 17C | 72  | 75.0 | 72   | 75.0 | 0    | 0.0   |     |   | 37 D | 53  | 55.2 | 72   | 75.0 | 19   | 35.8  |     |   |
| 18D | 52  | 54.2 | 62   | 64.6 | 10   | 19.2  |     |   | 38 B | 49  | 51.0 | 65   | 67.7 | 16   | 32.7  |     |   |
| 19A | 64  | 66.7 | 73   | 76.0 | 9    | 14.1  |     |   | 39 C | 44  | 45.8 | 60   | 62.5 | 16   | 36.4  |     |   |
| 20B | 44  | 45.8 | 74   | 77.1 | 30   | 68.2  |     |   | 40 D | 45  | 46.9 | 63   | 65.6 | 18   | 40.0  |     |   |

Chart G3

Averages of Knowledge Scores by Question for Control Group (Pre-test Scores in Relation to Post-test Scores)

|     | PRE |      | POST |      | DIFF<br>Cor | PER<br>% |     | PRE |      | POST |      | DIFF<br>Cor | PER<br>% |
|-----|-----|------|------|------|-------------|----------|-----|-----|------|------|------|-------------|----------|
|     | COR | %    | COR  | %    |             |          |     | COR | %    | COR  | %    |             |          |
| 1D  | 34  | 44.2 | 43   | 55.8 | 9           | 26.5     | 21B | 72  | 93.5 | 72   | 93.5 | 0           | 0.0      |
| 2A  | 46  | 59.7 | 41   | 53.2 | -5          | -10.9    | 22B | 33  | 42.9 | 32   | 41.6 | -1          | -3.0     |
| 3A  | 36  | 46.8 | 38   | 49.4 | 2           | 5.6      | 23B | 54  | 70.1 | 51   | 66.2 | -3          | -5.6     |
| 4A  | 71  | 92.2 | 66   | 85.7 | -5          | -7.0     | 24B | 23  | 29.9 | 17   | 22.1 | -6          | -26.1    |
| 5B  | 45  | 58.4 | 43   | 55.8 | -2          | -4.4     | 25A | 22  | 28.6 | 21   | 27.3 | -1          | -4.5     |
| 6D  | 62  | 80.5 | 51   | 66.2 | -11         | -17.7    | 26C | 66  | 85.7 | 70   | 90.9 | 4           | 6.1      |
| 7C  | 68  | 88.3 | 66   | 85.7 | -2          | -2.9     | 27A | 47  | 61.0 | 48   | 62.3 | 1           | 2.1      |
| 8A  | 48  | 62.3 | 40   | 51.9 | -8          | -16.7    | 28D | 62  | 80.5 | 54   | 70.1 | -8          | -12.9    |
| 9C  | 7   | 9.1  | 3    | 3.9  | -4          | -57.1    | 29A | 24  | 31.2 | 30   | 39.0 | 6           | 25.0     |
| 10D | 75  | 97.4 | 71   | 92.2 | -4          | -5.3     | 30A | 25  | 32.5 | 17   | 22.1 | -8          | -32.0    |
| 11D | 7   | 9.1  | 5    | 6.5  | -2          | -28.6    | 31C | 47  | 61.0 | 52   | 67.5 | 5           | 10.6     |
| 12C | 16  | 20.8 | 17   | 22.1 | 1           | 6.3      | 32D | 62  | 80.5 | 66   | 85.7 | 4           | 6.5      |
| 13B | 41  | 53.2 | 44   | 57.1 | 3           | 7.3      | 33C | 37  | 48.1 | 46   | 59.7 | 9           | 24.3     |
| 14C | 39  | 50.6 | 50   | 64.9 | 11          | 28.2     | 34B | 66  | 85.7 | 63   | 81.8 | -3          | -4.5     |
| 15B | 57  | 74.0 | 61   | 79.2 | 4           | 7.0      | 35D | 38  | 49.4 | 34   | 44.2 | -4          | -10.5    |
| 16D | 68  | 88.3 | 70   | 90.9 | 2           | 2.9      | 36D | 38  | 49.4 | 30   | 39.0 | -8          | -21.1    |
| 17D | 64  | 83.1 | 59   | 76.6 | -5          | -7.8     | 37D | 50  | 64.9 | 54   | 70.1 | 4           | 8.0      |
| 18C | 35  | 45.5 | 47   | 61.0 | 12          | 34.3     | 38B | 46  | 59.7 | 46   | 59.7 | 0           | 0.0      |
| 19D | 65  | 84.4 | 60   | 77.9 | -5          | -7.7     | 39D | 51  | 66.2 | 50   | 64.9 | -1          | -2.0     |
| 20A | 32  | 41.6 | 39   | 50.6 | 7           | 21.9     | 40B | 37  | 48.1 | 33   | 42.9 | -4          | -10.8    |