

THE ROLE OF CONTINUING EDUCATION IN THE
IDENTIFICATION OF HARMFUL EXERCISES:
A SURVEY OF OKLAHOMA SECONDARY
PHYSICAL EDUCATION TEACHERS

BY

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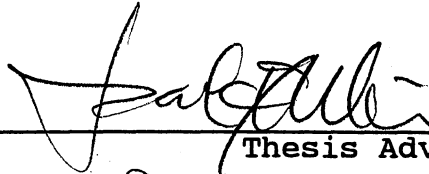
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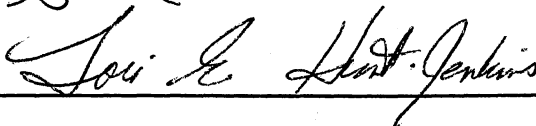
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CHAPTER I

INTRODUCTION

All exercises are not good for all people; nor are all exercises bad for everyone (Burgess, 1990; Lindsey, 1989). According to the American College Of Sports Medicine (ACSM), several exercises that have been " popular for several years should be avoided by certain exercisers because they could lead to injury, or by everyone because they are simply less effective than other exercises" (ACSM, 1992).

When parents place their children in the hands of public school teachers, they want the best possible education for their children. Physical education teachers must continue to update their knowledge in the field of exercise performance in order to provide the safest most beneficial information to the children they are teaching.

It is the responsibility of the physical education instructor to teach children how to exercise properly, become proficient in sports, and to live longer healthier lives (Corbin & Lindsey, 1993; Siedentop, 1994). However, if teachers do not keep abreast of the current practices and changes, are they providing what is best for the children?

Need for the Study

This study was designed to assess and determine whether Oklahoma secondary physical education teachers can identify harmful exercises in the classroom. Potential benefits arising from this study will be an increased awareness among teachers in identifying changes in exercise techniques, and the attainment of knowledge needed for the prevention of injury in the classroom, and an opportunity for personal growth in the field of physical education.

In the state of Oklahoma once a teacher receives a teaching certificate, serves the entry year requirement, and teaches three of five years in an accredited school, he/she only need to reapply for the continuation of his/her teaching certificate. There are no other state requirements that must be met for a teacher that has been teaching for several years, within the state, that insures parents or administrators that the children are receiving the most current information available to them (State Department Of Education (SDOE), 1994).

Because of the advancements in science and medicine, and the changes in exercise toward the prevention of injury to the human body, it is important to update one's knowledge in the field of physical education. By doing so, physical educators will be able to provide high quality education for the children in their classrooms (Hays, 1979, pp. 33-35; Tally, 1992).

Purpose of this Study

The purpose of this study was to:

1) Develop an instrument to measure knowledge among Oklahoma Secondary Physical education teachers of high risk exercises included in physical education classes.

2) Determine if such variables as educational level of the teacher, inservice, workshop, convention attendance, gender, and coaching experience of the teacher influence their identification of high risk exercises in the classroom.

HYPOTHESIS

Oklahoma Secondary Physical Education teachers who do not update their knowledge on exercise techniques will not be able to correctly identify as many harmful exercises on a questionnaire form as those teachers who do continue to update their knowledge base. The null hypotheses to be tested in this study are:

H_0 : There will be no difference in the ability to identify harmful exercises between teachers who continue their education through workshops, conventions, or inservices and those who do not continue education following initial certification.

H_1 : There will be a difference between gender groups in the ability to identify harmful exercises among Oklahoma Secondary physical education teachers.

H_2 : There will be a difference between coaching and non-coaching groups in the ability to identify harmful exercises.

DELIMITATIONS

This study was delimited by the following:

- 1) A random sample size of 210 out of 1,145 Oklahoma Secondary Physical Education Teachers, and
- 2) The development of an Educational/Exercise Questionnaire.

LIMITATIONS

This study was limited by the following:

- 1) The most current list of the Oklahoma Secondary Physical Education Teachers provided for the study was one year old.
- 2) Medical research studies supporting the theories behind the physical harm caused by the various high risk exercises are scarce.
- 3) Responses to the survey are self-reported.

ASSUMPTIONS

- 1) All Oklahoma Secondary Physical Education Teachers teach exercises to their students.

2) Physical education teachers do not teach the exercises they know to be harmful for the students.

3) Survey respondents will truthfully answer the questions.

DEFINITIONS OF TERMS

1) Convention: A formal assembly or meeting of professionals, lasting for more than one day. Usually organized by an elected board of professionals, representing a large organization.

2) High Risk Exercises: According to the ACSM guidelines, biomechanical experts, International Fitness Instructors of America (IDEA), and other exercise and fitness experts, high risk exercises are those exercises deemed unsafe, or less effective for some individuals due to the possible muscle, tendon, ligament, and or vertebral injury that may occur from performing them. (ACSM, 1992; Alter, 1983; Corbin, & Lindsey, 1990; IDEA, 1993).

3) Inservice: A formal or informal meeting of professionals lasting for not more than one day. Usually organized by a school district, for their school teachers, administrators, and paraprofessionals.

4) Microtrauma: Minute tears in muscle or connective tissue caused by repeated strain. Often referred to as overuse injuries.

5) Overuse Injury: Damage to muscles, tendons, ligaments, and bones caused by excessive exercise (Corbin & Lindsey, 1990).

6) Physical Education Teacher: An individual holding at least a Bachelors degree in Physical Education, from an accredited institution.

7) Workshop: A formal or informal meeting of professionals lasting from one-half day to two days. Usually organized for a smaller group of professionals.

CHAPTER II

REVIEW OF LITERATURE

The review of literature in this chapter addresses the following concerns: A) Previous studies in the area of exercise knowledge among secondary physical educators. B) The need to practice prevention instead of rehabilitation when teaching exercises to children. C) Identifying the various exercises that may cause harm to some individuals and D) the importance for physical education teachers to consider individual differences when developing exercise programs.

There appear to be no studies which directly assess the knowledge of secondary physical education teachers relative to the exercises they teach their students. Kenetha Green (1985), a graduate student from Oklahoma State University, did a study assessing the need for certification of aerobic instructors. The main purpose of the study was to address the need for a standardized certification program for aerobic instructors. The instrument used was a questionnaire that addressed the competencies/qualifications thought to be important in the field of aerobics; and

whether there should be a standardized testing program for all aerobic exercise instructors. The instrument addressed such questions as understanding the role and benefits of exercise in promoting health and fitness, measuring blood pressure, teaching aerobic exercise at different levels, and identifying acute and chronic responses to exercises.

A second, similar study was conducted by Anthony Abbott (1989), a Doctoral student from Florida Atlantic University. Abbott's study was concerned with the exercise science knowledge base of commercial fitness instructors within the State of Florida. The instrument used was a written exam given to ACSM instructors and commercial fitness instructors in Florida. The exam addressed the ability to deliver a safe and effective exercise program to various clients, the ability to identify various muscles involved in exercising, measuring blood pressure and heart rate, designing an exercise program, and the understanding of proper nutrition, and other health habits.

Although both previous studies were concerned with the competencies of the instructors in their ability to deliver a sound program, and the educational level or knowledge base of the instructors, neither study dealt specifically with various types of exercise techniques.

According to an article on fitness guidelines for children, "Exercise and physical fitness programs begun in

the early years are part of a preventive for later life" (Greene & Adeyanju, 1991).

Exercise behavior patterns taught to children in a school environment influence their exercise patterns as adults (Dishman, 1988). Therefore, it is important for children to be taught proper exercising techniques, when to stop if an exercise begins to hurt, and how to choose safe exercises (Alter, 1983; Garrick, 1986; & Thomas, 1992).

Physical Education teachers and coaches must design their programs for prevention instead of rehabilitation, because the majority of the sports related injuries are due to overuse, rapid progression, or an imbalance in the muscle growth caused by improper training (Binkhorst, 1985; Dymont, 1991).

Physical Education should be fun for all children, yet too often some of the children learn to dislike physical education because they have to exercise (Corbin & Lindsey, 1993). Physical Education teachers teach exercises to large groups of children who perform those exercises in unison. Physical education teachers usually give little consideration for individual differences among those groups of children doing the same exercises, at the same time (Corbin & Lindsey, 1989; Garrick, 1986; Monrow). It is the responsibility of the physical education teacher to keep the enjoyment of regular exercise/activity alive, and encourage

physical fitness as a healthy way of life (Corbin & Lindsey, 1994).

In the publication by Rasch & Burke (1978), several different organizations condemned such exercises as the duck waddle and the full squat because of the potential injuries these exercises can cause the knee joint. The organizations as a whole stated that because of the amount of stress placed on the ligaments and tendons in the joint, or to the muscles involved when performing these exercises, the individual places himself at greater risk for injury (Rasch & Burke, 1978).

Corbin and Lindsey (1994), were concerned with exercises physical education teachers had been teaching their students for several years. Another study by Corbin & Lindsey (1989) identified some "Commonly Misused and Abused" exercises taught in physical education classes that are potentially harmful to children. Included in the list of harmful exercises are double leg lifts, hurdler stretch, yoga plough, and full squats. "If performed incorrectly, or repetitively, these exercises cause microtraumas or overuse injuries to the muscles or tissues being worked" (Corbin & Lindsey, 1989, pp. 26-32).

In an article "If I Knew Then What I Know Now," Lindsey (1987) was quoted as saying, "If I knew what I know now I wouldn't have given my real estate agent wrong advice; and I might not be limping from osteoarthritis of the hip

and knee from abusing my body in training." She goes further with her concern with the types of exercises being taught by identifying 56 "common" exercises taught in physical education programs. If performed incorrectly, or unsupervised, and over a period of time, such exercises as the bicycle, standing toe touch, and straight leg sit-up may cause damage to the areas of the head and neck, back, arms, abdominal, knees, ankles, and hips. The article by Lindsey (1987), discussed the potential harm caused by those high risk exercises, and recommends some safer, less stressful alternative exercises.

Goodman (1987), expressed her concerns for the prevention of exercise injury as follows:

The cosmetic athlete exercises primarily to attain or maintain an attractive physical appearance. Those who fail to take into account the effects of normal aging, or individual differences in physical characteristics may incur overuse injuries... Untrained or improperly trained individuals who continue to push themselves to be like everyone else tend to hurt themselves easier, and take longer to recover from those incurred injuries (pp. 97-102).

Additionally the article warned against exercises that require hyperextension, hyperflexion, repetitive jumping, and overstretching (Goodman, 1987, pp. 97-102).

The studies by Corbin & Lindsey, (1987) and Goodman (1987) are supported by the American College Of Sports Medicine, (ACSM, 1992, pp. 41-60), which stated that some exercises that have been popular for years should be avoided by some exercisers because they could lead to physical

injury, or by everyone simply because they are less effective than other exercises.

Although backed by several experts, not all researchers agree with the extent to which exercises should be labeled high risk. For example, Lubell (1989, pp. 178-192) stated "Doing research on high risk exercises is difficult because you can not have a control group; and some exercises must be practiced for certain sports." Yet, there are published documents circulating the professional, medical, and fitness fields listing several exercises that are stated as being high risk because of the possible injuries that may occur due to the repetitive action, or incorrect performance of certain exercises by some individuals (Lubell, 1989). Therefore, according to Tally (1993), "as physical education teachers, exercise leaders and coaches, it is important to become familiar with the changes in exercise techniques in order to prevent physical harm, or at least, prevent the dislike for exercise among today's children."

The importance of knowing current changes in exercises is emphasized by Sharpe, Liemohn and Snodgrass (1988), in an article that stated that "a thorough understanding of exercises typically performed, important for all exercise leaders, would appear to be imperative for professionals working with children because youngsters, due to their youth and resilience, may unknowingly be victims of our sometimes misguided exercise prescriptions." Sharpe et al. (1988, pp.

74-78) went on to say that prescribing exercises for the school aged population should be taken seriously because it is desirable to teach exercises that can be done safely well into adulthood.

Alter (1983), described common, harmful exercises that are habitually taught. The exercises discussed cause spinal discs to degenerate, tear the muscles they are intended to tone, and often do not provide a balance of stretching and strengthening for opposing muscle groups. Among the don't do list are exercises that require the participant to bounce, arch the back or neck, bend and swing, go fast, and hyperextend or hyperflex. Alter (1983), stated that the old saying "no pain, no gain" is definitely out; that if "it hurts stop!"

In summary, several researchers believe repetitive use of poor technique and body mechanics generates musculoskeletal imbalance, and ultimately leads to injury. Exercise injuries are caused by overtraining, overuse, poor technique, and an imbalance of muscle groups. Exercises that are safe for some are not safe for others. Therefore, educators must consider individual differences, and the purpose of each exercise they teach. Injuries caused by high risk exercises are not always apparent immediately following or during the exercise bout (Corbin & Lindsey, 1990; Kelly, 1988; Micheli, 1993, & Thomas, 1992).

Many researchers in this area agree that while individualizing exercise programs is nearly impossible, it should be a goal, and that most injuries occur as a result of excessive repetition, improper technique, and or rapid progression. It is also agreed by these experts that further research is needed in this area. (Alter, 1983; Corbin & Lindsey, 1990, 1993; Dishman, 1988; Garrick, 1986, 1990; Micheli, 1993; Nicholas, 1986; Smith, 1989; & Thomas, 1992).

CHAPTER III

METHODS AND PROCEDURES

The purpose of this study was to determine the extent to which the variables of inservices, conventions, workshops, higher education classes, gender, and coaching experience were related to the ability of Oklahoma Secondary Physical Education teachers in identifying high risk exercises.

The procedures described in this chapter are as follows: A) Preliminary Procedures which include the construction and design of the preliminary instrument, selection of a panel of experts for professional validity and reliability, and the construction of the final instrument; B) Operational Procedures which include: the selection of subjects and collection and analysis of data.

PRELIMINARY PROCEDURES

Prior to the study an application was submitted to the Institutional Review Board of Oklahoma State University for approval. Approval for the proposed study was granted. A copy of the approval may be found in appendix A.

DESIGN AND CONSTRUCTION OF THE INSTRUMENT

Based upon the initial review of literature, several exercise techniques once considered safe and effective for all have been labeled as high risk for certain individuals (Monrow, 1993).

Therefore, the researcher constructed an instrument that would measure knowledge among Oklahoma Secondary Physical Education teachers with the current knowledge of the changes in the exercise techniques by having the teachers identify those high risk exercises. Based on the review of literature, a list of high risk exercises was constructed containing both effective exercises and high risk exercises. In addition to the list of exercises, the instrument contained various questions addressing the educational background of the teacher.

A copy of the original instrument was submitted to Dr. Frank Kulling, Dr. Steve Aldana and Dr. Lori Hunt-Jenkins for review. Dr. Kulling suggested that a cover letter be added. Dr. Aldana and Dr. Hunt suggested rewording of some of the statements. The original instrument may be found in appendix B.

EXPERT VALIDATION OF QUESTIONNAIRE

Once the instrument was developed for testing purposes the researcher selected a panel of experts to determine the instruments validity. Based upon the expertise in research and in the field of physical education and exercise, five individuals were selected for the panel. All five individuals consented to participate. The individuals were: Teresa Vollenweider, Exercise Physiologist, Iowa State University - Owner of N.E.W. Lifestyles; Dr. Charles Corbin, Professor Exercise Science and Physical Education, Arizona State University; Dr. Bert Jacobson, Associate Professor, Director of Graduate Studies in Health, Physical Education, and Leisure, Oklahoma State University; Dr. Steve Edwards, Professor Sports Psychology, Oklahoma State University; Dr. Kathy Black, Professor of Physical Education, University of Central Oklahoma.

The panel members were encouraged to make any suggestions in the wording of any statement, and to make any suggestions directly on the form. If the panel member approves the content validity, he/she was asked to sign the instrument and return the entire form to the researcher.

A copy of the comment form used for this purpose may be found in Appendix C. Editorial changes suggested by the panel of experts were made where the researcher and committee felt such changes clarify the statement without

changing the intended question. A copy of the final instrument may be found in Appendix D.

DETERMINATION OF QUESTIONNAIRE RELIABILITY

A pilot study was conducted to test the reliability of the instrument. Using a random numbers table found in THE EDUCATIONAL RESEARCH COMPETENCIES FOR ANALYSIS AND APPLICATION (1987), twenty-one Secondary Physical Education teachers were selected to participate in the testing process. The selected educators were sent a copy of the cover letter explaining the purpose of the instrument, and a copy of the questionnaire. The teachers were asked to participate by filling out the questionnaire and return it to the researcher. Two weeks after sending the initial questionnaire, a second copy of the same instrument was sent. The results may be found in the collection of data section of this chapter.

SELECTION OF SUBJECTS

The researcher of this document contacted the Oklahoma State Department of Education and requested a current listing of all Secondary Physical Education teachers by districts, throughout the state. A list was received from the Oklahoma State Department of Education, however the list was one year old.

Using a random numbers table (1987), a selected group of 210 out of 1,145 Secondary Physical Education teachers, by school districts, in the state of Oklahoma were selected to participate in the study.

A copy of the cover letter and questionnaire were mailed to each of the randomly selected Secondary Physical Education teachers. No names were used by the researcher to identify the individual instructors. If a physical education teacher chose to receive the results of the questionnaire, there was a place provided at the end of the form for the teacher to fill in his/her name and address. The information when received was coded and the questionnaires were destroyed.

COLLECTION AND CODING OF DATA

A questionnaire and a cover letter explaining the purpose of the study were mailed to the selected group of Oklahoma Secondary Physical Education teachers in January, 1994. The teachers were asked to complete the questionnaire and return the form to the researcher within a three week period. There was a return postage paid form attached to the questionnaire for the teachers convenience.

Once the questionnaires were returned, the researcher numerically coded and recorded, on a spread sheet, the responses for analysis.

The total score was computed numerically by the number of harmful exercises correctly identified as being harmful = 1, the number of harmful exercises not correctly identified as being harmful = 0, the number of non-harmful exercises correctly identified as being non-harmful = 1, and the number of non-harmful exercises incorrectly identified as being harmful = 0.

TEST-RETEST FOR RELIABILITY

There were twenty-one randomly selected Oklahoma Secondary Physical Education teachers and Physical Education Student Teachers used to conduct a pilot study to test the instruments reliability.

The subjects were sent a cover letter explaining the purpose of the pilot study, and a copy of the questionnaire. The subjects were asked to participate in the study by completing the questionnaire, returning the form, and at a later date (two weeks) completing a second copy of the original instrument. Once the questionnaires were completed and returned by the subjects, their responses were numerically coded, recorded, and analyzed.

In accordance with the confidentiality of the subjects, once the responses were recorded and analyzed the questionnaire forms were destroyed.

Inferential Analysis of Dependent Variables

ANOVA

Statistical analysis used to determine differences in each dependent variable was a one-way analysis of variance (ANOVA). The independent variables were workshop, convention, inservice, and course. The dependent variable used was total score. For the variables workshop, convention, and inservice the respondents were asked to determine how often they were in attendance according to the Likert scale labeled: All the time =4, Frequently =3, Sometimes =2, Rarely/Never =1. For the Variable Course, the respondents were asked to determine when they most recently completed a courses in exercise. The relative scale was as follows: Within the past year =1, Within the past three years =2, not within the past three years=3, not within the past ten years =4, and never =5. The level of significance, alpha, was set at .05 ($p < .05$); and a Newman-Kuels follow-up test was run to varify the results.

T-TEST

T-tests were used to determine the difference between total score and gender (male=1 female=2), coaching (coaching=1, not coaching=2), and educational level (Bachelor=1, Master=2). Alpha was set at .05 ($p < .05$) level of significance.

Correlations

A Spearman coefficient correlation was used to determine relationships between independent variables and total score. The independent variables were workshop, convention, inservice, course, and teaching years. The level of significance was set at .05 ($p < .05$).

A Pearson Correlation was used to determine the reliability of the instrument. The level of significance was set at .05 ($p < .05$).

CHAPTER IV

RESULTS

The purpose of this chapter is to present the results of the data collection as it relates to the research questions of the study.

RESULTS OF DATA

A questionnaire was mailed to 210 Oklahoma Secondary Physical Education teachers. Of the 210 questionnaires sent out, 51 responded, thus the mailing resulted in an overall return rate of 24%.

DEMOGRAPHICS

Frequencies were calculated for the following question: Respondents were asked to identify their gender; 68% of the respondents reported were male, 32% were female.

Frequencies were calculated for the exercises correctly identified as being harmful, and not harmful. There were twenty-six (26) exercises listed on the questionnaire and of those listed, fifteen (15) were considered harmful and eleven (11) were considered non-harmful. For the respondents reported; 57% of the males correctly identified between

eight (8) and twenty-three (23) exercises, 70% of the females correctly identified between eight (8) and twenty-three (23) exercises.

Respondents were asked to identify their educational level, as well as the academic department that granted their degree. All of the respondents ($n=51$) reported holding at least a Bachelor's degree. Nineteen (19) respondents reported holding a Masters degree in a respective field. Thirty (30) of the respondents reported having an academic degree in Physical Education. Of the remaining respondents eleven (11) reported Physical Education and Health; four (4) reported Secondary; three (3) reported Science; one (1) reported Health; one (1) reported Elementary; and one (1) reported having an academic degree in some other field.

Respondents were asked to identify the year they received their initial degree. The mean year for the respondents receiving their initial degree was 1979.

Respondents were asked to identify their number of teaching years. Respondent's years of teaching averaged 11.68 years.

The respondents were asked if they were currently coaching a sport, and if so what gender were they coaching. Forty-one (41) of the respondents were currently coaching. Sixteen (16) of the respondents were coaching males, thirteen (13) of the respondents were coaching females, and

twelve (12) of the respondents were coaching both males and females.

Respondents were asked how often they attended the following: Workshops, conventions, and inservices. Table 1 shows the frequency distributions of responses for the respondents.

Frequency of Attendance

Workshop, Conventions, and Inservice

TABLE 1					
	Always Attend	Frequently Attend	Sometimes Attend	Rarely Attend	Never Attend
Workshops	10	19	17	3	2
Conventions	10	23	9	2	7
Inservices	10	21	13	1	6

n=51

Respondents were asked when they last attended a physical education workshop. Twenty (20) of the respondents reported attending a physical education workshop one year ago. The mean time period for attending a workshop for physical education was 3.25 years ago.

Respondents were asked when they last took a course in exercise. The following figure shows the frequency distributions of the responses for the respondents. The mean year for the last course in exercise reported was 2.94.

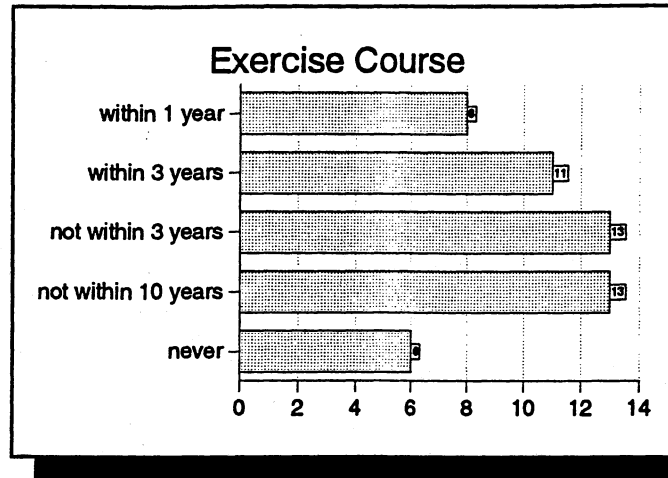


Figure 1

Respondents were asked to identify where their major source of information was obtained. The following figure represents the major source of information reported for the respondents:

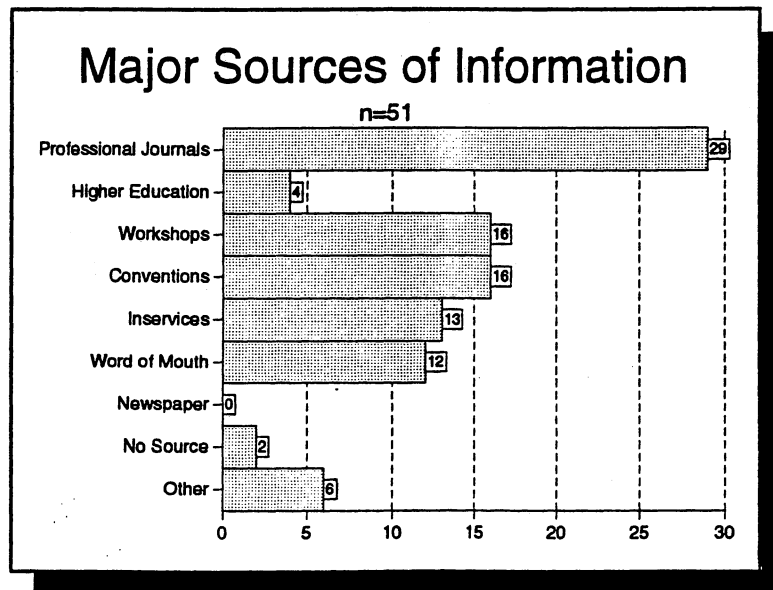


Figure 2

Respondents were asked to check the exercises they felt were harmful to the physical education students they taught. The following figure shows the frequency distribution for exercises thought to be harmful.

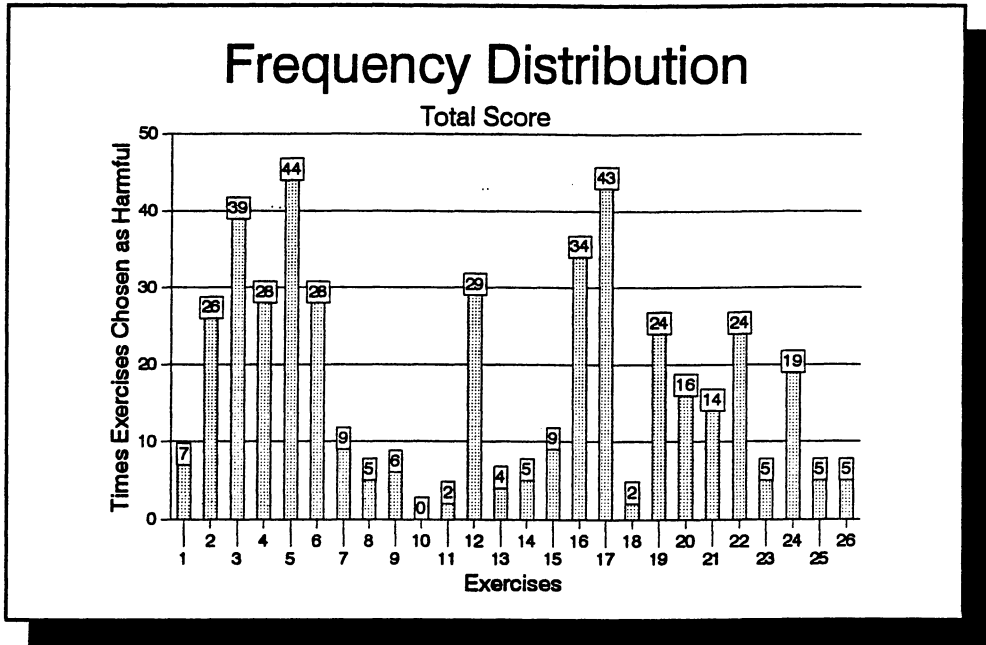


Figure 3

T-TEST RESULTS

T-tests were used to explore the possibility of differences between total score and gender, coaching, and educational level.

Table 2 shows a statistically significant difference between the male and female respondents at the .05 level, ($p < .05$).

T-Test

Gender by Total Score

Table 2					
Gender	N	Mean	T-Value	DF	P
Male	35	15.400			
Female	16	18.625	-3.10	49	.003*

* $p < .05$

Table 3 shows no statistically significant difference between coaches and non-coaches at the .05 level, ($p > .05$).

T-Test

Coach by Total Score

Table 3					
Coach	N	Mean	T-Value	DF	P
Do Coach	41	16.561			
Do not Coach	10	15.800	0.57	49	0.568

Table 4 shows no statistically significant difference between educational levels (Bachelor, Master) at the .05 level, ($p > .05$).

T-Test

Education Level by Total Score

Table 4					
Education Level	N	Mean	T-Value	DF	P
Bachelor's	32	16.4688			
Graduate Degree	19	16.3158	0.14	49	0.889

SPEARMAN CORRELATION RESULTS

Spearman correlation coefficients were computed to determine the relationship between total score and workshop, convention, inservice, course, and number of teaching years.

Although the following table suggests an inverse relationship between the variables and total score, the variables used in this study are individually defined. A Physical education teacher may teach a physical education class and coach, but he/she may also teach a core subject course such as Math or History. Therefore if the teacher is attending conventions, workshops, or educational classes for Math or History and not physical education, the teacher's total score on this questionnaire would not be affected by his/her attendance at the forums.

Table 5 shows a statistically significant relationship between convention and total score at the .05 level, ($p < .05$). There were no statistically significant relationships found between the variables inservice, course, and the number of teaching years, with total score, ($p > .05$).

Spearman Correlation

Table 5	
Spearman Correlation	Score
Workshop	-0.1324
Convention	-0.2936*
Inservice	0.1766
Exercise Course	-0.1691
Years	0.1103

* $p < .05$

PEARSON RELIABILITY RESULTS

Pre-test, post-test results were computed with the total score variable to determine the reliability of the instrument. With alpha set at .05 ($p < .05$), the correlation coefficient for the test was .9347*.

ANOVA RESULTS

A one-way analysis of variance (ANOVA) was computed to determine differences within the following variables: Workshop, convention, inservice, and course. The dependent variable used was total score.

Table 6 shows no statistically significant difference at the .05 ($p > .05$) level of significance for workshop attendance. The overall mean for workshop equals 16.4118 (± 3.73). The means and standard deviations for each Likert value for workshop are as follows:

Group 1: Rarely/Never = 17.20 ± 3.2 , Group 2: Sometimes = 17.00 ± 3.69 , Group 3: Frequently = 15.73 ± 4.13 , Group 4: All the time = 16.30 ± 3.49 .

Analysis of Variance

Workshop Attendance by Total Score

Table 6					
	SS	DF	MS	F	P
Main Effect: By Workshop	17.7687	3	5.9229	0.4102	0.7464
Residual	678.5842	47	14.4380		
Total	696.3529	50			

Table 7 shows no statistically significant difference at the .05 ($p > .05$) level of significance for convention attendance. The overall mean for convention equals 16.4118 (± 3.73). The means and standard deviations for each Likert value for convention are as follows: Group 1: Rarely/Never = 18.88 ± 3.75 , Group 2: Sometimes = 17.44 ± 4.09 , Group 3: Frequently = 15.30 ± 3.54 , Group 4: All the time = 15.80 ± 2.89 .

Analysis of Variance

Convention Attendance by Total Score

Table 7					
	SS	DF	MS	F	P
Main Effect: By Convention	96.7723	3	32.2574	2.5286	0.0686
Residual	599.5807	47	12.7570		
Total	696.3529	50			

Table 8 shows no statistically significant difference at the .05 ($p > .05$) level of significance for inservice attendance. The overall mean for inservice equals 16.4118 (± 3.73). The means and standard deviations for each Likert value for inservice are as follows: Group 1: Rarely/Never = 17.57 ± 3.86 , Group 2: Sometimes = 14.69 ± 3.59 , Group 3: Frequently = 16.14 ± 3.48 , Group 4: All the time = 18.40 ± 3.65 .

Analysis of Variance

Inservice Attendance by Total Score

Table 8					
	SS	DF	MS	F	P
Main Effect: By Inservice	88.8980	3	29.6327	2.2927	0.0902
Residual	607.4549	47	12.9246		
Total	696.3529	50			

Table 9 shows no statistically significant difference at the .05 ($p > .05$) level of significance for course taken. The overall mean for course equals 16.4118 (± 3.73). The means and standard deviations for each Likert value for course are as follows: Group 1: Within the past year = 16.62 \pm 4.50, Group 2: Within the past 3 years = 17.27 \pm 3.13, Group 3: Not within the past 3 years = 17.00 \pm 4.39, Group 4: Not within the past 10 years = 15.92 \pm 2.87, Group 5: Never = 14.33 \pm 4.08.

Analysis of Variance

Exercise Course by Total Score

Table 9					
	SS	DF	MS	F	P
Main Effect: By Course	42.0397	4	10.5099	.7389	.5703
Residual	654.3132	46	14.2242		
Total	696.3529	50			

CHAPTER V

Summary, Conclusions and Recommendations

This chapter presents a summary of the study, findings, and recommendations for further studies.

Summary

The purpose of this study was to design an instrument that would measure current knowledge of high risk exercises among Oklahoma Secondary Physical Education teachers; and to determine if such variables as gender, coaching experience, educational level of the teacher, the teacher attending workshops, inservices, and or conventions, would influence their ability to identify high risk exercises.

A survey questionnaire was sent to 210 Oklahoma Secondary Physical Education teachers, of which fifty-one (51) responded, equalling an overall return rate of twenty-four percent (24%). Of the respondents, sixty-eight percent (68%) were males and thirty-two percent (32%) were females.

The questionnaire consisted of two parts. The first part of the instrument requested demographic information.

The second part was designed to determine the current knowledge of the teachers by having them identify harmful exercises from a list of both harmful and non-harmful exercises.

The data was compiled and analyzed using the following statistical methods: frequencies, t-tests, Spearman correlation coefficient, Pearson correlation coefficient, and a one way analysis of variance (ANOVA).

Based on the hypotheses stated and the limitations of this study, the following findings were determined: There was a significant difference found between gender groups, and total score; and convention and total score. The difference found between gender may be attributed to the fact that over half of the responding females taught physical education and coached, whereas half of the male respondents worked in administration and coaching, but had done some teaching prior to their administrative assignment. Therefore this difference may be attributed to the increased teaching experience of the women.

The difference found in the variable convention may be due to the selection of activities at a convention, and the time in which most conventions are offered. There are actually conventions with activities that deal with physical education and exercise, thus providing an opportunity for obtaining current knowledge. The time of year most conventions are offered may also be more

convenient for coaches and physical education teachers because most conventions are held during the summer and at semester break. Therefore there was a significance difference found in the variable total score and convention.

There were no other significant differences found between total score and the other independent variables. It is uncertain why no significant differences were found between total score and workshops or inservices. Possible explanations may be that workshop and inservice are so closely related in the design and organization within the professional realm, that they may not differ in the amount of knowledge an attendee may receive; and there are not many inservices or workshops strictly geared for physical education teachers. Finally, attendance at workshops and inservices may be substantially less than at conventions.

Finding no significant differences in the total score and the variable teaching years may be attributed to the fact that eighty percent (80%) of the male as well as eighty percent (80%) of the female respondents have been teaching for less than twenty (20) years; there was no major difference in the teaching years between genders.

Lack of differences between coaches and non-coaches may be attributed to the fact that those individuals that are not currently coaching have done so in the past, therefore the coaching background and knowledge is established and may

be an underlying agent in the ability to identify harmful exercises.

Based on the educational background of the respondents there was not an adequate number of graduate degrees in the field of Physical Education to determine a significant difference in the knowledge base of the respondents. In comparing the educational levels of the Physical Educators for recommending that they keep abreast of the current information for the students they teach, perhaps gathering information from more sources with Physical Education as their higher degree would have proven more beneficial in this study.

Conclusions

The purpose of this study was to develop an instrument to measure knowledge among Oklahoma Secondary Physical Education teachers in their ability to identify high risk exercises; and to determine if such variables as education level of the teacher, inservices, workshops, conventions attended by the teachers, or the gender, and coaching experience of the teacher effected the teaching of high risk exercises in the classroom. The null hypotheses in this study was that there was no difference in the ability to identify harmful exercises between teachers who continued their education following their initial certification. This study failed to reject all but one of the variables in the

null hypotheses at the .05 level of significance. This study rejected the variables convention and gender at the .05 level of significance. The alternative hypotheses were accepted at the .05 level of significance because there was a difference found in the ability to identify harmful exercises between the male and female respondents.

Recommendations for Further Studies

Based on the data collected and the results of the study, it is evident that additional research is needed in determining why some secondary physical education teachers continue to teach exercise techniques that are harmful to their students.

It would have been beneficial to have a larger representation of individuals holding advanced degrees in the field of physical education/exercise science. If so, Educational level may become significant.

Additionally, actual attendance records rather than Likert score predictions could be used to quantify the educational experiences.

Finally, the medical and exercise science profession must direct more research towards the exact mechanisms which cause some exercises to be considered "harmful", while other exercises are not considered "harmful".

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APPENDIXES

APPENDIX A
INSTITUTIONAL REVIEW BOARD APPROVAL

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
FOR HUMAN SUBJECTS RESEARCH

Date: 12-15-93

IRB#: ED-94-041

Proposal Title: EXERCISE AND EDUCATION ANALYSIS SURVEY TITLED:
OPINION QUESTIONNAIRE

Principal Investigator(s): Frank Kulling, Cynthia Robinson

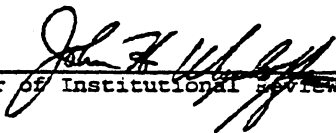
Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

APPROVAL STATUS SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING.
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL. ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Signature:


Chair of Institutional Review Board

Date: December 16, 1993

APPENDIX B
ORIGINAL INSTRUMENT

EXERCISE and EDUCATION

Analysis

The purpose of this analysis is to gather information from a randomly selected group of Oklahoma Secondary Physical Education instructors concerning the type of exercises they teach their physical education students, and to obtain information concerning the physical education instructor's educational background.

This analysis will take about 10 minutes of your time. Thank-you for taking the time to participate. Your answers are important; and your responses will be anonymous and confidential. Please complete the analysis and place it in the mail by December 1, 1993.

DIRECTIONS: Place an X in the box, or write in your response in the space provided that best answers the following questions.

Gender: Male Female

1. What year did you complete your undergraduate degree? _____

2. What was/is your major field of study?

Elementary Ed.	<input type="checkbox"/>	Science	<input type="checkbox"/>
Health	<input type="checkbox"/>	Secondary Ed.	<input type="checkbox"/>
Physical Ed.	<input type="checkbox"/>	Other	<input type="checkbox"/>

3. Did you complete your Physical Education degree in the state of Oklahoma? If no, from which state? Please write in.

YES NO _____

4. What is your highest level of education? Please check your highest degree then circle the + years.

B.S.	<input type="checkbox"/>	B.S. + 3	6	9	12	
M.S.	<input type="checkbox"/>	M.S. + 3	6	9	12	13+
PhD.	<input type="checkbox"/>	Other	<input type="checkbox"/>	_____		

5. What field is your highest degree in? _____

6. When did you last take a course in Exercise? (ie. How to correctly perform a sit-up.)

- Have never taken a course.
- Have taken a course within the past year.
- Have taken a course within the past three years.
- Have not taken a course within the past three years.
- Have not taken a course within the past ten years.

7. Are you Certified in the state of Oklahoma as a Physical Education instructor?

YES NO

8. How many years have you taught Physical Education? Please write in.

9. What grade level of Physical Education do you teach? Please write in.

10. Are you a Coach?

YES [] NO []

What gender do you Coach? Male [] Female []

11. What sport(s) do you coach?

Football	[]	Track-n-field	[]
Basketball	[]	Wrestling	[]
Softball	[]	Gymnastics	[]
Baseball	[]	Soccer	[]
Volleyball	[]	Tennis	[]

12. Are you a member of OAHPERD (Oklahoma Association of Health, Physical Education, Recreation, and Dance)?

YES [] NO []

13. Are you a member of the Oklahoma Coaches Association?

YES [] NO []

14. Do you attend Professional Workshops, Conventions, or Inservices?

YES [] NO []

15. Do you attend workshops sponsored by ACSM (American College of Sports Medicine), or other Sports Medicine type organizations? If other, please write in the organization.

YES [] NO [] OTHER [] _____


















16. When was the last Physical Education workshop you attended?






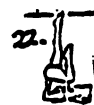
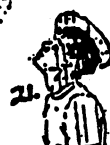
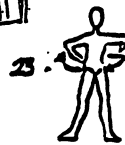

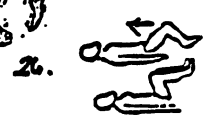
1992-1993	[]	1987-1988	[]
1991-1992	[]	1986-1987	[]
1990-1991	[]	1985-1986	[]
1989-1990	[]	OTHER	[]
1988-1989	[]		

17. Where does your Major source of Updated/New information on exercise come from?

Professional Journals	[]	Word of Mouth	[]
Higher Education Courses	[]	Newspaper	[]
Workshops	[]	None	[]
Conventions	[]	Other	[]
Inservices	[]		

From the following lists of exercises, place an X in the box next to the exercises you feel may be harmful to your physical education students.

- [] 1. Arm circles 
- [] 2. Bent Knee Sit-ups 
- [] 3. Cradle 
- [] 4. Double Leg Lifts 
- [] 5. Duck Walk 
- [] 6. Hurdle Stretch  
- [] 7. Inner Thigh Stretch 
- [] 8. Inverted Hurdle Stretch 
- [] 9. Jumping Jacks 
- [] 10. Modified Push-ups 
- [] 11. Modified Sit-ups 
- [] 12. Plough 
- [] 13. Push-ups 
- [] 14. Single Leg Lifts 
- [] 15. Standing Quadriceps Stretch 
- [] 16. Straight Leg Sit-ups 

- [] 17. Squats-full 
- [] 18. Squats-half 
- [] 19. Squat Thrusts 
- [] 20. Toe Touches 
- [] 21. Full Neck Circles 
- [] 22. Bicycle 
- [] 23. Trunk Twists 
- [] 24. 3 Count Hamstring Stretch 
- [] 25. Hang Stretch 
- [] 26. Reverse Sit-ups 

APPENDIX C
EXPERT VALIDATION OF QUESTIONNAIRE
COMMENT FORM

COMMENTS:

	<u>Very Good</u>	<u>Good</u>	<u>Average</u>	<u>Poor</u>	<u>Very Poor</u>
1. Quality of product	[]	[]	[]	[]	[]
2. Content	[]	[]	[]	[]	[]
3. Ability to convey information	[]	[]	[]	[]	[]
4. Readability	[]	[]	[]	[]	[]
5. Purpose of product	[]	[]	[]	[]	[]

I WOULD APPROVE THE QUESTIONNAIRE WITH THE FOLLOWING SUGGESTIONS TAKEN INTO CONSIDERATION.

Name: _____
Position: _____

APPENDIX D
COVER LETTER FOR QUESTIONNAIRE AND
OPINION QUESTIONNAIRE

SCHOOL OF HEALTH, PHYSICAL EDUCATION AND LEISURE
COLVIN CENTER
OKLAHOMA STATE UNIVERSITY
STILLWATER, OK 74078

(405) 744-5507

January 20, 1994

Cover Letter for Opinion Questionnaire

The purpose of this questionnaire is to gather information from a randomly selected group of Oklahoma Secondary Physical Education instructors concerning the type of exercises they teach their physical education students. Also, the survey is designed to obtain various information concerning the physical educator's educational background.

The questionnaire will be used to show significant value in continuing education as it relates to the prevention of physical injury to the developing child. Your identity will be kept confidential and your responses will be used in aggregate form only.

If you wish to receive a copy of the results from this survey, there will be a space provided at the end of the questionnaire form for you to place your name and mailing address. Your identity will be separated from your responses prior to analysis.

Thank you,

C. L. Robinson

C. L. Robinson
Graduate Assistant

OPINION QUESTIONNAIRE

The purpose of this questionnaire is to gather information from a randomly selected group of Oklahoma Secondary Physical Education instructors concerning the type of exercises they teach their physical education students, and to obtain information concerning the physical education instructor's educational background.

This questionnaire will take about 10 minutes of your time. Your answers are important, and your responses will be anonymous and confidential. Please complete the questionnaire and place it in the mail by February 15, 1994. Thank-you for taking the time to participate.

DIRECTIONS: Place an X in the box, or write in your response in the space provided that best answers the following questions.

Gender: Male Female

1. What year did you complete your undergraduate degree? _____
year

2. What was/is your major field of study? (check one)

Elementary Ed.	<input type="checkbox"/>	Science	<input type="checkbox"/>
Health	<input type="checkbox"/>	Secondary Ed.	<input type="checkbox"/>
Physical Ed.	<input type="checkbox"/>	Other	<input type="checkbox"/>

3. Did you receive a Physical Education degree from the state of Oklahoma? If no, from which state? Please write in.

YES NO _____
write name of state

4. What is your highest level of education? Please check your highest degree.

B.S.	<input type="checkbox"/>	Other	<input type="checkbox"/>	_____
M.S.	<input type="checkbox"/>			
PhD.	<input type="checkbox"/>			

5. In what field is your highest degree? _____
write name of field

6. When did you last take a course in Exercise? (ie. How to correctly perform a sit-up.)

- Have taken a course within the past year.
- Have taken a course within the past three years.
- Have not taken a course within the past three years.
- Have not taken a course within the past ten years.
- Have never taken a course.

7. Are you an Oklahoma State Certified Physical Education teacher?

YES NO

8. How many years have you taught Physical Education? Please write in.

years

9. What grade level of Physical Education do you teach? Please write in.

grade level

10. Do you currently coach an athletic team?

YES NO

What gender do you Coach? Male Female Both

11. What sport(s) do you coach? Put an X next to all sports that apply.

Football	<input type="checkbox"/>	Wrestling	<input type="checkbox"/>
Basketball	<input type="checkbox"/>	Gymnastics	<input type="checkbox"/>
Baseball	<input type="checkbox"/>	Soccer	<input type="checkbox"/>
Softball	<input type="checkbox"/>	Tennis	<input type="checkbox"/>
Volleyball	<input type="checkbox"/>	Other	<input type="checkbox"/>
Track-and-field	<input type="checkbox"/>		

12. Are you a member of OAHPERD (Oklahoma Association of Health, Physical Education, Recreation, and Dance)?

YES NO

13. Are you a member of the Oklahoma Coaches Association?

YES NO

14. How often do you attend Professional Workshops, Conventions, or Inservices?

	All the Time	Frequently	Sometimes	Rarely	Never
WORKSHOPS:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CONVENTIONS:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
INSERVICES:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. Do you attend workshops sponsored by ACSM (American College of Sports Medicine), or other Sports Medicine type organizations? If other, please write in the organization.

YES NO OTHER _____
organization name

16. When was the last Physical Education workshop you attended?

1992-1993	<input type="checkbox"/>	1987-1988	<input type="checkbox"/>
1991-1992	<input type="checkbox"/>	1986-1987	<input type="checkbox"/>
1990-1991	<input type="checkbox"/>	1985-1986	<input type="checkbox"/>
1989-1990	<input type="checkbox"/>	OTHER	<input type="checkbox"/>
1988-1989	<input type="checkbox"/>		

17. Where does your Major source of Updated/New information on exercise come from? Check ONE

Professional Journals	<input type="checkbox"/>	Word of Mouth	<input type="checkbox"/>
Higher Education Courses	<input type="checkbox"/>	Newspaper	<input type="checkbox"/>
Workshops	<input type="checkbox"/>	None	<input type="checkbox"/>
Conventions	<input type="checkbox"/>	Other	<input type="checkbox"/>
Inservices	<input type="checkbox"/>		

From the following lists of exercises place an X in the box next to the exercises that you feel may be harmful to your physical education students.

[] 1. Arm circles



[] 2. Bent Knee Sit-ups



[] 3. Cradle



[] 4. Double Leg Lifts



[] 5. Duck Walk



[] 6. Hurdle Stretch



[] 7. Inner Thigh Stretch














[] 8. Inverted Hurdle Stretch



[] 9. Jumping Jacks



- [] 10. Modified Push-ups 
- [] 11. Modified Sit-ups 
- [] 12. Plough 
- [] 13. Push-ups 
- [] 14. Single Leg Lifts 
- [] 15. Standing Quadriceps Stretch 
- [] 16. Straight Leg Sit-ups 
- [] 17. Full Squats 
- [] 18. Half Squats 
- [] 19. Squat Thrusts 
- [] 20. Toe Touches 

[] 21. Full Neck Circles



[] 22. Bicycle



[] 23. Trunk Twists



[] 24. 3 Count Hamstring Stretch



[] 25. Hang Stretch



[] 26. Reverse Sit-ups



If you wish to receive a copy of the results of the questionnaire please provide the following information:

Name: _____

Address: _____

This information will be coded and only used for mailing you the results of the questionnaire. Your identity will be kept confidential.

Vita

Cynthia L. Robinson

Candidate for the Degree of

Master of Science

Thesis: THE ROLE OF CONTINUING EDUCATION IN THE IDENTIFICATION OF HARMFUL EXERCISES:
A SURVEY OF OKLAHOMA SECONDARY PHYSICAL EDUCATION TEACHERS

Major Field: Health, Physical Education and Leisure

Biographical:

Personal Data: Born February 5, 1984 in Santa Fe, New Mexico, the daughter of Patricia Prewitt.

Education: Graduated from Sharpstown High School, Houston, Texas, in May 1982; received Bachelor of Art in Teaching Degree from Sam Houston State University, Huntsville, Texas, in May 1986; completed the requirements for the Master of Science Degree at Oklahoma State University, Stillwater, Oklahoma, in December 1994.

Professional: Middle School Physical Education teacher, El Campo Independent School District, El Campo, Texas; Junior High Physical Education Teacher, Judson Independent School District, Converse, Texas; Teaching Assistant, Department of Health, Physical Education, and Leisure, Oklahoma State University, August 1992, to May 1994.