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THE EFFECTS OF TRADITIONAL AND CONTINGENCY MANAGEMENT METHODS ON
PERFORMANCE IN SELECTED VOLLEYBALL SKILLS

DISSERTATION

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

by

Mary Jo Campbell, B.S., M.A.

The Ohio State University
1973

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CHAPTER I

INTRODUCTION

In the past fifteen years some promising advances have been made in the technology of behavior. These large strides have occurred in understanding and dealing with human behavior and the environmental events that affect it. Based on Skinner's operant conditioning, behavioral psychologists have emphasized the programming of consequences to modify measurable, observable behavior. Two basic tenets that have emerged from their research are: (1) Behavior is lawful, and (2) Behavior is, for the most part, determined by its consequences (Berman, 1971). This means that the consequences of behavior determine the rate of future occurrence of that behavior. If a behavior is rewarded (positive reinforcement), then the probability of that behavior recurring is increased. The converse is also true. If a behavior has negative consequences, the probability of that behavior recurring is decreased.

These tenets form the basis for the system called contingency management. A contingency is a relationship between a behavior and a consequence (Valentine, 1971). Contingency management means two things: (1) To specify ahead of time what consequence will occur as a result of performing a particular skill; (2) To make sure that after the skill is performed, the consequence does occur.
The origins of contingency management come from the work of David Premack (1959). Through his experiments, Premack found that a high probability event (a behavior that occurs frequently) could be used to reinforce a low probability event (a behavior which does not occur frequently). Simply stated, "if behavior B is of higher probability than behavior A, then behavior A can be made more probable by making behavior B contingent upon it" (Homme, 1963, p. 544). Premack called this the differential probability hypothesis.

In 1963, when working with three year old nursery school children, Homme (1963) first applied the differential probability hypothesis to an educational situation. Since he couldn't use punishment or material rewards, little work was being accomplished by the children as they spent most of their time running around the room and screaming. Homme decided these behaviors were high probability events and thus made them contingent on low probability events, such as paying attention. If the children performed as they were asked for a short period of time, they then could run and scream. At a signal they would stop and begin engaging again in the desired way. In other words, the children's behavior was controlled without the adult having to use aversive consequences. From this experience Homme stated:

This kind of contingency management put us in immediate control to the extent that we were able to teach everything in about one month that we could discover was ordinarily taught in first grade. (Homme, 1963, p. 544).

Originally, contingency management primarily used high probability events. It has now expanded to include the use of many
kinds of reinforcement systems. Many research studies report successful modification of the behavior of abnormal subjects. The behavior of psychotics (Ayllon, 1965; Hingten, 1966; Winkler, 1970), mentally retarded (Birnbrauer, 1964; Zimmerman, 1969), autistic children (Hanblin, 1969; Wolf, 1964), and learning disabled children (McKenzie, 1968) has been modified in different experimental settings. Deviant or disruptive behavior in the classroom has also been altered and modified by using contingency management (Barrish, 1969; McAllister, 1969; O'Leary, 1967; Wasik, 1970). In addition, academic performance has been increased using this system (Gerlach, 1963; Lovitt, 1969; Salzberg, 1971).

In educational settings, tokens (such as poker chips or points) have been often used as secondary reinforcers. Students earn tokens for displaying appropriate behavior, eg. attending to the task at hand for thirty minutes, performing ten arithmetic problems correctly, etc. The students later exchange their tokens for specified privileges such as ten minutes to read comics or work puzzles (Homme, 1970).

More sophisticated contingency management systems have been devised for use with college students. Keller (1968) was the first to propose a method of teaching a college course by systematically applying reinforcement theory. In his course, the material to be learned was divided into thirty units. The student had to show his mastery of a unit of content by passing a readiness test before he was allowed to go on to the next unit. The student's final grade was based primarily on the number of units he accomplished. This method of teaching rests on the assumption that all college students
are capable of mastering the course content at a high quality level. However, some will work at a faster pace than others. Students in such a course are given frequent feedback as to how they are progressing. They also are frequently reinforced since the content is broken down into many small units and they know exactly what is expected of them in order to earn a specific grade.

The Keller-like courses are being taught in a diversity of disciplines, subject matters, levels of education, and geographical locations (Personalized System of Instruction Newsletter, 1972). Several experimenters have reported about college courses based on these procedures (Ferster, 1968; Lloyd, 1969; Malott, 1969; Myers, 1970). Formal research studies comparing the performance of students in traditionally taught classes and students taught by contingency management classes all found the experimental method to be superior (Born, 1972; McMichael, 1969; Sheppard, 1970; Witters, 1972). On attitude scales, the experimental subjects also indicated their preference and enjoyment for the contingency managed classes over the traditionally taught classes.

**Rationale**

A major problem that educators have faced has been that of motivating students to perform tasks which adults have determined are desirable. This has usually been attempted by using aversive consequences if students did not perform as they were told. Consequently, many students learn because of fear of punishment rather than because they find it enjoyable. Many other students even find
the learning situation so aversive that they merely quit trying or become drop outs. At this time there is much criticism of the educational situation. Many feel that students are graduating without the desired knowledges and skills that are commonly listed as educational objectives. In our present educational systems, students rarely know exactly what is expected of them. Also, course content is often not systematically arranged so that the learner moves through a series of progressive approximations to the terminal desired behavior (shaping). Third, in today's classroom, reinforcement is quite infrequent. It is usually unplanned and not always contingent on a desirable behavior. Fourth, what reinforcement does occur is often negative (Skinner, 1954).

According to Skinner: "teaching is a situation in which the teacher arranges the contingencies of reinforcement to expedite learning by the child" (Skinner, 1969, p. 15). To teach effectively it is necessary to explicitly state to the learner what should be learned, the order in which it should be learned, the level of quality at which the student is expected to perform, and the consequences that will accrue to the student when he does perform at the desired level (Bijou, 1970).

Recent research has shown that contingency management can be very effectively used in education at all age levels with normal as well as abnormal children. As yet, no research has been published concerning the superiority of the traditional method or the contingency management method in teaching physical education skills. McDonald (1971) and Fast (1971) presented samples of contingency
contracts they have used in their secondary physical education classes. However, no comparison has been made to their former teaching methods. Pina (1971) explained the systems approach used in physical education in a new community college. Each course had clearly written performance objectives. The student progressed at his own pace. When he had passed all the objectives, he had passed the course. There was no time limit, so the slow learning student could take as much time as he needed.

Contingency management has been quite successful in teaching college psychology and statistics classes. Theoretically it appears that it could also be equally effective in teaching physical education skills in a required course where motivation is often low.

Statement of the Problem

The purpose of this study was to compare the performance of college women taught the skills of volleyball by the traditional method to that of women taught by the contingency management method.

Hypotheses

The following null hypotheses were tested for significance at the .05 level:

1. There is no significant difference in the performance of volleyball setting skill between the women enrolled in the traditional classes and the women enrolled in the contingency management classes.

2. There is no significant difference in the performance of volleyball bumping skill between the women enrolled in the traditional
classes and the women enrolled in the contingency management classes.

3. There is no significant difference in the performance of volleyball serving skill between the women enrolled in the traditional classes and the women enrolled in the contingency management classes.

4. There is no significant difference in the performance on a volleyball knowledge test between the women enrolled in the traditional classes and the women enrolled in the contingency management classes.

5. There is no significant difference in attitude toward the learning experience between the women enrolled in the traditional classes and the women enrolled in the contingency management classes.

Assumptions

1. The knowledge test, the three skill tests, and the attitude rating scale will yield reliable and valid data.

2. The initial volleyball skills of the members of the traditionally taught classes are approximately equal to the initial skills of the members of the contingency management classes.

3. The teachers will put forth equal effort in presenting both the traditional and contingency management methods.

Limitations

1. This study was limited to women enrolled in four volleyball classes Fall quarter, 1972 at The Ohio State University.

2. This study was based on intact classes so there was partial randomization of subjects to teaching methods.

3. The study was limited to classes which met only fifteen times for a thirty minute period.
Definitions

**Performance objective** - an objective which describes the final outcome of instruction and practice in terms of observable behavior, states the conditions under which the final performance will occur, and specifies the level of performance needed to meet the objective (Wheeler and Fox, 1972).

**Contingency management class** - a class that utilizes a method of teaching which involves explanation and demonstration by the teacher (or films) of the skills to be learned, individual practice by the student utilizing a list of performance objectives involving skill, and playing in the game situation. This method emphasizes individual practice, self-paced progress of each individual, and the necessity of performing at a designated level of skill in order to pass a performance task. The student's final grade is contingent on the number of performance tasks she has passed by the end of the term.

**Traditional class** - a class that utilizes a method of teaching which involves explanation and demonstration by the teacher (or films) of the skills to be learned, practice by students in individual, dual, and small group drills, and playing in the game situation. The student's grade is based on: (1) The teacher's subjective evaluation of the student's playing ability in the game, (2) a written knowledge examination, and (3) skill tests on serving, setting, and bumping.
CHAPTER II

REVIEW OF RELATED LITERATURE

This investigation was concerned with the application of contingency management procedures to the learning of motor skills in a normal physical education class. The research related to the problem is practically nonexistent in physical education literature. However, psychological literature, over the past ten years, has presented considerable evidence consistently supporting the effectiveness of contingency management (Rushall and Siedentop, 1972). The behavior of many different kinds of subjects has been successfully modified in a variety of environmental settings using several forms of reinforcement. Because of the wide range of information pertinent to contingency management, this chapter was organized into three main sections: Guidelines for contingency management, forms of contingency management, and subjects used in contingency management research.

Guidelines for Contingency Management

Contingency management is derived from the principles of operant psychology. The contingency manager tells his subjects what behavior is expected from them and what reinforcement they will receive for displaying the target behavior. The following guidelines from operant psychology must be followed in setting up a contingency
management system if behavioral change is to be systematic and con­
sistent (Rushall and Siedentop, 1972).

(1) Behaviors must be defined in observable and measurable
terms. If this is not done, the behavioral manager cannot
know definitely the success or failure of his system.

(2) Terminal behaviors must be specified clearly. The subject
must know exactly what is expected of him in order to
receive the contingent reinforcement.

(3) The target behavior must be the one that is reinforced.
If reading speed is to be increased, then only reading
speed should be reinforced. However, if reading speed
and comprehension are to be increased, then both factors
must be reinforced.

(4) The contingency must be clearly stated. In order for the
subject to be motivated, he must know exactly what rein­
forcement he will receive for behaving in the desired
manner. "Ten minutes of extra recess time" states both
the type of reinforcement and the length of time he will
be allowed to engage in it.

(5) The contingency must be fair. It is unrealistic and in­
effective to expect a student to work several hours for
a small reinforcement.

(6) At the beginning, tasks should be small and reinforcement
frequent. If the task is too great, no amount of reward
will help. Also, it has been found that small frequent
reinforcements are far superior to a few large ones.
Continuous measurement is necessary. This is important so that the contingency manager knows the initial level of his subject's behavior, can observe progress toward the target behavior, and can determine when the task is completed.

**Forms of Contingency Management**

Research studies in contingency management differ in many respects, although they all follow the above guidelines. One of the basic differences is in the arrangement of the contingencies used. Three types of contingency systems can be cited (Rushall and Siedentop, 1972).

**Task-Reward Systems**

The task-reward system, historically, was the earliest one used and is the simplest. In this system, a subject is rewarded immediately after performing the desired task. For example, after working ten arithmetic problems correctly, a student would be allowed ten minutes to read anything he desired. This system works especially well with young children (Homme, 1963). However, it tends to disrupt the ongoing process in some situations.

**Token Systems**

Token systems involve the use of secondary reinforcers that can be later exchanged for back up reinforcers. Poker chips or other tangible materials are often used as tokens and have been employed successfully with children (Phillips, 1968), psychiatric patients (Winkler, 1970), and the retarded (Birnbrauer, Wolf, Kidder, and Tague, 1965). In such a system, the subject saves his tokens until a specified time. He is then allowed to trade in the tokens for back
up reinforcers which he values. In schools, children have been allowed to exchange tokens for special privileges such as watching a movie, reading books, having free time, etc. In some studies, they could buy toys, paper, pencils, etc. at a general store set up in the school. Another method often used is earning points for a grade (Lloyd and Knutzen, 1969). In this case, the grade acts as the backup reinforcer.

**Contract Systems**

The contingency contract or performance contract is an agreement between a teacher and a student in which the teacher promises rewards in return for the desired learning behavior by the students (Homme, 1970). Usually the contract contains several units or micro-contracts. Reinforcement may occur immediately after completion of the micro contract or it may be deferred. At first the teacher generally sets up the contract. After a period of time, though, it is feasible for the student to construct his own contract (Homme, 1970).

**Subjects Used in Contingency Management Research**

Researchers have utilized contingency management systems in a variety of settings using many different kinds of subjects. In the majority of cases, the system has been applied only in specific situations for a few hours each day. However, Phillips (1968) employed this method for the entire daily routine of pre-delinquent boys living in a small home-style, residential treatment program called Achievement Place. In this program, three to eight boys who had committed minor offenses lived with a pair of house-parents and attended the local schools. Phillips, who was a house-parent,
instituted a token program in which the boys could earn or lose points according to their behavior. Target behaviors were selected in social, self care, and academic areas. The behaviors such as being punctual, cleaning one's room, watching the news on TV, performing homework, and obtaining satisfactory grades earned points for the boys. They could lose points for speaking aggressively, arguing, using poor grammar, lying, etc. The earning or losing of points was marked down on a 3 x 5 card which each boy always carried. At the end of each week, the points were totaled and the boys could buy the privileges which they desired. The privileges or back up reinforcers were items or events which were naturally available in the home such as allowance, snacks, staying up late, watching TV, etc. Experiments were carried out on five target behaviors: Decrease in use of aggressive statements, bathroom cleaning, punctuality, decrease in use of poor grammar, and increase in quality and quantity of homework. In all five areas, the token program was quite successful in modifying behavior in the desired direction.

Because of the wide range of studies, the remainder of this section is categorized according to the types of subjects used in contingency management systems.

Psychiatric patients

Experimenters have used contingency management systems in therapeutic and rehabilitation programs for a wide variety of mental disorders (Ullmann and Krasner, 1965). Ayllon and Azrin (1965) were among the earliest to publish a report in which token reinforcement was applied to a mental ward population. Six experiments were
described, all of which used the A-B-A experimental design in which each subject served as his own control. Tokens that the patient earned could be used to buy desired reinforcers from six main categories: privacy, leave from the ward, social interaction with staff, devotional opportunities, recreational opportunities, and commissary items. Experiment I studied the relationship of the ward reinforcement procedure to the performance of eight patients on off-ward assignments. Initially the patients were allowed to choose the job they wanted such as dietary worker, clerical helper, laboratory work, or laundry help. They worked six hours per day, five days a week. Each person received seventy tokens for one day of satisfactory work performance. After ten days they were told they would no longer receive tokens for their preferred job. However, if they chose to change jobs, they would continue earning tokens. After ten more days they were told that their current job would no longer pay tokens, but they could return to their preferred job for token earning. Results showed that seven of the eight patients immediately shifted from the preferred to the non-preferred job as soon as the reinforcement was shifted. Return to the preferred job was equally abrupt when the reinforcement procedure was changed for the second time. In addition, all eight subjects reported promptly to work for all thirty days. This is unusual as normally such patients are erratic and inconsistent in their job performance.

Experiment II included three phases using the same eight patients. In the first phase the worker received seventy tokens after each day's work. Then during the second phase the worker was given the
seventy tokens in the morning and was told he could keep them even if he did not work that day. During phase three, the conditions were changed back to those set in phase one where reinforcement was contingent upon performance. Results showed that all patients worked the entire time during phases one and three. However, not one worked during phase two. The authors concluded: "The absolute level of patients' performance can be drastically modified by arranging the token reinforcement procedure contingent upon performance". (Allyon and Azrin, 1965, p. 367).

The three phase design of Experiment II was utilized in Experiment III but for on-ward jobs which required only approximately one hour of work a day. All forty four ward patients served as subjects. During the twenty days of phase one, about forty five hours were spent each day performing work assignments. On the first day of phase two (tokens received without being contingent on work), the amount of work decreased to about thirty five hours. By the sixteenth day, work output had dropped to only one hour per day. When phase three was begun (tokens contingent on work), the time spent on job assignments immediately rose to forty five hours per day and was maintained at that level for the remainder of the experiment.

Experiment IV was similar to Experiment III except that during phase two no tokens were given and reinforcements were free to the patients. Results of phase one and three show that about forty five hours of work per day was performed. However, during phase two, work output decreased to about ten hours per day with ten people doing the majority of the work. These ten people were used as the
subjects in Experiment V. During the first phase they could continue at their preferred job for eighty tokens a day or take a non-preferred job for one token a day. After six days their supervisor informed them that in the future they could earn only one token for the preferred job but eighty tokens for the non-preferred job. After six more days, the procedures of phase one were reinstated. Nine of the ten patients immediately chose the higher paying job, regardless of their job preference. However, the tenth patient did not change to the higher paying but less preferred job until six days later.

The last experiment was similar to Experiment I except written, instead of verbal, instructions were used to be certain that the attendant giving the job assignments did not sway the patients' choice. Results were identical to those in Experiment I. This indicated that job choice and performance was determined by the token reinforcement procedure and not by the oral instruction of the attendants.

All six experiments demonstrate that the token system was effective in maintaining desired performance. As soon as reinforcement was not contingent on working, performance dropped to near zero level. When the system was reinstated, performance increased dramatically.

Although using different target behaviors, Winkler (1970) reported similar results applying a token reinforcement system in a chronic psychiatric ward. He was able to modify the behavior of thirty six patients in attendance and participation at morning exercises, getting up, dressing, and bed making. Violence and noise
were also decreased even though the reinforcement was not contingent on these behaviors. However, when the patients were fined tokens for disruption, the violence and noise decreased even more.

Other forms of behavior have also been modified using contingency management procedures. Cooperative responses between early childhood schizophrenics have been increased by making reinforcement contingent upon the emission of these behaviors (Hingtgen, 1966). Psychotic verbal behavior was decreased by a combination of extinction (ignoring) and social reinforcement (Ayllon and Michael, 1959). The behavior problems of autistic children have been decreased by using positive reinforcement (Hamblin, 1969) and a combination of extinction and positive reinforcement (Wolf, Risley, and Mees, 1964). Even severely disturbed behaviors have been successfully modified with the use of operant conditioning principles. By shaping and using positive reinforcement, Issacs et al. (1960) reinstated eating behavior of an anorexic. Numerous other case studies have shown the successful effects of a contingency management program on neurotic and psychotic behaviors (Ullmann and Kransner, 1965).

Exceptional Children

Several investigators have employed contingency management procedures with the retarded and learning disabled. Most of these studies attempted to modify disruptive classroom behavior, while only a few used academic tasks as the target behaviors.

O'Leary and Becker (1967) studied the effects of a token economy program on the behavior of the eight most disruptive children
in a third grade adjustment class. Seventeen students had been placed in this class because they exhibited undesirable classroom behaviors such as temper tantrums, crying, and fighting. During a four week baseline period the teacher was instructed to use her normal teaching procedures. The token program was then initiated only for the afternoon hours. Students were told they would receive point ratings (between one and ten) from the teacher three to five times a day. The number of points they received were dependent on the extent to which they followed instructions. The points could be exchanged for a variety of back up reinforcers such as candy, peanuts, comics, and kites. During the first three days the tokens (points) were exchanged for reinforcers at the end of the token period. Then for the next four days, exchanges were made every two days. A three day delay of reinforcement was used for the next fifteen days. For the last twenty four days of the program a four day delay was used, hoping to transfer the control from the token reinforcers to the more traditional methods of teacher praise and attention. In addition, the teacher was instructed to make positive social comments whenever possible and to ignore deviant behavior. The procedures appeared to be quite successful. Deviant behavior decreased from 76% during the base period to 10% during the token period. However, because the study did not return to the baseline conditions, it cannot be stated that the token system and not other factors accounted for the observed reduction of deviant behavior. The authors believe, though, that if baseline conditions had been reinstated, disruptive behavior would have increased. Two interesting implications of the study were that the
program was successful even though a student had to wait four days for reinforcement and according to anecdotal reports, the children behaved better during the morning sessions (no token procedure) than they had prior to the program.

Kuypers et al. (1968) designed a study similar to the one just reviewed. Socially maladjusted students served as subjects. The main difference was that in this study the teacher was not knowledgeable in operant conditioning techniques. The investigators wished to examine the effectiveness of the token system by itself in a classroom in which no other modifications were made in the teacher's handling of the class such as the use of shaping, differential social reinforcement throughout the day, and time out procedure. Only an average significant effect of the token program was demonstrated. Also, desirable behavior did not generalize to the morning session when the token procedure was not in effect. The authors pointed out that a token program is not a magical procedure to be applied in a mechanical way. Other factors such as shaping, using differential social reinforcement, and having the teacher well trained in operant behavior techniques were cited as necessary to insure a successful program.

Token reinforcement has also been used with retarded children. Birnbrauer and Lawler (1964) shaped the behavior of thirty seven retarded children using candy as reinforcers and then gradually shifting to the use of poker chips as tokens that could be exchanged for candy, balloons, and trinkets. By the end of the school year, all but four students hung up their coats, took their seats quietly,
and waited for their assignments. Eleven children could work alone and persistently on programmed material. These behaviors were a dramatic improvement for this population. However, because of the design, statistical procedures could not be used to prove a significant change.

Zimmerman et al. (1969) successfully modified instruction following behavior in four of six retarded students by using a token program similar to O'Leary's (1967). Disruptive behaviors in another mentally retarded class were decreased from a mean of 16 per day to a mean of 2 per day by applying consequences to the classroom as a group (Sulzbacher, 1968). For every undesirable behavior exhibited, one minute was subtracted from a ten minute recess period.

Birnbrauer et al. (1965) instituted a token program with both behavior and academic performances as target behaviors for a retarded class. The study involved three phases - token, no token, and token. All three phases used social approval following good behavior, social extinction (no teacher response), and time out period for extremely disruptive behavior. Results showed that during the no token period three general patterns were obtained: (1) Five of the fifteen pupils showed no measurable change in performance, (2) Six pupils increased markedly in over-all percentage of errors or sufficiently to reduce progress, and (3) Four pupils showed an increase in percentage of errors, a decline in amount of studying, and an increase in disruptive behavior. When token reinforcement was reinstated, performance of ten pupils increased.

Academic behavior of children in a learning disabilities class
was significantly increased by using grades as tokens and home allowances as the back up reinforcers (McKenzie, 1968). The children took home a weekly grade report every Friday. The amount of their allowance was contingent on the grades they had earned.

**Regular Classroom Students**

Results of contingency management programs utilizing regular school children as subjects parallel the results obtained in the studies involving exceptional children. One main difference lies in the type of reinforcer used. Tokens with back up reinforcers such as candy and trinkets were most often used with exceptional children. However, in the regular public schools, reinforcers that were found naturally in the environment such as free time, extra recess time, or teacher attention were most often used. As was the case in the previous section, more studies were concerned with modifying social behavior than with increasing academic performance.

McAllister et al. (1969) reported about a contingency program in a high school English class which tried to modify inappropriate talking and turning around. The basic design was the pretest-posttest control group design combined with the use of a multiple baseline technique. After determining baseline conditions on the two behaviors, the teacher was instructed to verbally disapprove of all instances of inappropriate talking by naming and correcting the individual student but to not use threats. Also, she was to praise the entire class for good behavior - not individuals - if it was deserved after each thirty second period of the first two minutes of class and after each fifteen minutes throughout the remainder of the
class. After these conditions had been in effect for twenty six days, the teacher continued the same procedures but also for inappropriate turning around. During baseline conditions the average daily percentage of inappropriate talking intervals was 25% and 22% for the experimental and control classes respectively. After the verbal social approval and disapproval was initiated, the inappropriate talking decreased to 5% in the experimental class but was still 21% in the control class. Similar results occurred with inappropriate turning. Baseline scores were 15% for the experimental class and 14% for the control class. The control class remained the same, but after the experimental conditions, the experimental class score dropped to 4%. The authors concluded that teacher praise and disapproval can function to modify the behavior of high school students.

The systematic use of attention and praise to reduce the disruptive behavior of four first grade children was shown by Ward and Baker (1968). They found a significant improvement from baseline to treatment for these students.

O'Leary et al. (1969) employed a token program similar to the procedures used in their study on an adjustment class which was reported in the previous section (O'Leary and Becker, 1967). They successfully modified disruptive behavior in second grade children using a combination of teacher praise, ignoring undesirable behavior, and the token economy.

Out of seat and talking out behaviors were decreased in a regular fourth grade class by Barrish et al. (1969). Students were divided into two teams. Whenever disagreeable behavior occurred, a mark was
placed on the blackboard which meant a possible loss of privileges by all members of the offender's team. The privileges used were events available in most classrooms such as extra recess, first to line up for lunch, etc. Giving extra gym class time was the reinforcement used by Schmidt and Ulrich (1969) in controlling classroom noise level, while Wasik (1970) awarded free-choice activity time for the occurrence of desirable behavior. Both reinforcement programs proved quite effective.

Lovitt et al. (1969) published a report which supports the theory that a single classroom teacher can administer a contingency system with groups of children for the purpose of increasing academic performance. Using a fourth grade class, it was found that spelling performance improved significantly when reinforced with free-time and the privilege to listen to the radio. Salzberg et al. (1971) found that the accuracy of printing by kindergarten children could be improved beyond baseline conditions when access to play was contingent upon performance.

**College Students**

Contingency management in the university classroom is another application of operant behavior techniques. Like contingency management systems used in psychiatric wards and elementary schools, the programs for college students also involved a response and a subsequent reinforcement. The responses which were selected depended upon which target behaviors the instructor had sought to instill in his students. Ferster (1968) stressed verbal fluency, while McMichael and Corey (1969) and Lloyd and Knutzen (1969) designed their courses
so that the students experienced those behaviors most frequently engaged in by professionals in their field.

The primary backup reinforcer in college contingency management systems has been the final grade. However, since this reinforcement is delayed for such a long time, most of these courses have divided the grade into smaller parts so that the student can be reinforced frequently. Keller (1968) and McMichael and Corey (1969) have done this by dividing the course into many small units. Each unit must be passed at a specified level of mastery. The final grade is then dependent on the number of units passed. Lloyd and Knutzen (1968) designed their course on a point system. Points were earned by successfully completing small assignments.

Keller (1968) has summarized the features of a classroom contingency management system which distinguish it from the conventional teaching procedures.

"(1) The go-at-your-own-pace feature, which permits a student to move through the course at a speed commensurate with his ability and other demands upon his time.

"(2) The unit-perfection requirement for advance, which lets the student go ahead to new material only after demonstrating mastery of that which preceded.

"(3) The use of lectures and demonstrations as vehicles of motivation, rather than sources of critical information.

"(4) The related stress upon the written word in teacher-student communication; and, finally:

"(5) The use of proctors, which permits repeated testing, immediate scoring, almost unavoidable tutoring, and a marked enhancement of the personal-social aspect of the educational process." (Keller, 1968, p. 83)

The first college course based on contingency management procedures was proposed by Keller (1968). In this psychology course, the content was divided into thirty units. Each student received
the unit assignment and list of study questions which pointed out the important material. Seventy five per cent of the final grade was determined by the number of units he passed, while 25 percent was determined by his performance on a final exam. Whenever the student felt prepared, he took a "readiness" test over a unit. If he passed the test at the set criterion (usually 90 per cent), he was given the next unit assignment and study guide. However, if he failed, he was told to study some more and return later to take a different test. He could take as many readiness tests as he needed without any aversive consequences, except that his progress through the course was slowed down. It was at test taking time that the student received individual attention. The proctor graded the tests immediately and discussed the results with the student. There were no attendance requirements for the course. Lectures were given only four or five times during the term. In order to attend the lecture, a student had to have passed a certain number of units. Exams did not cover material given in the lecture. Thus, the lectures were planned to be motivational and to cover material that would be interesting to those students who chose to attend.

A point system for grading was used by Lloyd and Knutzen (1969) in teaching a class in the experimental analysis of behavior. On the first day of class each student was told the required activities, the maximum points for these activities, and the minimum required points for these activities, for each grade. For example, 600 points were needed for an A, 510 points for B, 410 points for C, and 310 points for D. If a student had earned a C grade halfway through
the term and was satisfied with it, he could stop attending the class. On the other hand, if he wished to earn an A and only had enough points for a B by the end of the term, he could take an incomplete and continue working during the following term.

Verbal fluency over course content was the primary required response of students enrolled in Ferster's (1968) psychology course. The material was divided into small units (ten to fifteen pages of the textbook). The students were required to schedule interviews with each other over each unit in which one student explained to another student the material he had just read. After the speaker finished talking, the listener commented on how the speaker covered the topic, pointed out important omissions, and corrected inaccuracies. If both students were satisfied that the interview showed mastery of the text, they recorded the results on a chart. If the interview was not satisfactory, the speaker restudied and scheduled another interview later. After three to five interviews, the student took a brief essay quiz from the section assistant. If the test was passed, the student began work on the next section. When a student failed a quiz, a remedial procedure was discussed with the instructor. The student's final grade was based on how much of the course of study he completed. Results showed that 36 per cent of the class finished the course requirements three weeks before the end of the semester and 72 per cent finished before the last day of class. Ninety per cent of those enrolled earned A's, 4 per cent earned B's, and only 6 per cent earned C's.

Malott and Svinicki (1969) taught a psychology course using
the same principles employed in the previously mentioned courses. One difference noted was their use of the "Doom's Day Contingency". If a student did not pass a quiz with 100 per cent mastery, he must either drop out of the course or receive a failing final grade. This was easy to avoid since a quiz could be taken many times. Very few students were affected by this contingency.

In another psychology course, Johnson and Pennypacker (1971) emphasized verbal fluency of the course content. After attending lectures and reading the text, students went to their manager and answered fill-in questions presented in a flip-card or programmed-text format. After the quiz, the manager discussed the course content with the student. A criterion was set for the maximum number of incorrect responses and the minimum number of correct responses that were acceptable. A cumulative record of each student's performance was kept.

Keller-like teaching procedures have also been found successful in teaching courses other than psychology. Green (1971), in teaching physics, Koen (1970) in teaching engineering, and Myers (1970) in teaching statistics have reported very favorable results.

Only four studies were found which compared the effectiveness of Keller-like classes with conventionally taught classes. McMichael and Corey (1969) reported that a psychology class taught by contingency management procedures performed significantly better on a final exam than did three control classes. The course content for the experimental class was divided into twelve units. A student had to
pass a ten question readiness unit quiz before receiving a study guide for the next unit. Sixty per cent of his final grade was determined by the number of units he passed and 40 per cent by his performance on a final exam. The control classes were taught in the conventional manner with three lectures being delivered each week. These students also took three or four one hour exams during the term. In control class A the final exam counted 40 per cent of the final grade, while in controls B and C it counted 50 per cent. The same final exam was administered to all four classes at the end of the term. Out of a possible score of 50, the mean score for control A was 35; for control B, 34; for control C, 34; for the experimental class, 40. Also, the students were asked to rate the overall quality of the course on a 0 to 10 scale (0=extremely poor; 10=extremely good). The student ratings showed that the experimental group rated the course significantly higher than did the control groups.

Sheppard and MacDermot (1970) obtained similar results using the interview procedure proposed by Ferster (1968). The students were told how many interviews and readiness unit quizzes they had to pass at the set criterion in order to get an A, B, C, or D. They took a final exam, even though it did not influence their final grade. The control group was taught in a conventional manner. The final exam counted 50 per cent of their grade. The experimental groups did significantly better than the control group and also rated the course higher on an attitude scale. The authors attributed these results to the following positive features of the contingency manage-
ment procedures: The student is actively involved; he progresses at his own pace; he progresses in small steps and receives immediate feedback; his study behavior is reinforced by his own performance during the interview; he is not penalized for repeating unsatisfactory interviews or exams; he is immediately reinforced; the aversive control set by the threat of tests is minimized; he does not compete with others for grades; he does not concentrate his studying at the end of the term; and his study habits are improved because the interview procedure teaches the student how to study effectively.

Results favoring the contingency management classes over conventional classes have also been reported by Witters and Kent (1972) and Born et al. (1972). Both studies stated that academic mastery was greater and that student enjoyment of the class was higher in the Keller-like classes.

Physical Education Students

There is a paucity of information regarding the use of contingency management procedures in physical education settings. However, Libb and Clements (1969) successfully controlled exercise behavior by the application of reinforcement procedures. Also, Rushall (1969) shaped skilled motor behavior in a swimmer by using feedback as the reinforcer. The amount of work volume accomplished during swimming practice has been increased by Rushall and Pettinger (1969) by applying different reinforcement procedures. For swimmers age twelve and under, candy and money were found to be more effective reinforcers than praise from the coach. No difference in reinforcement procedure
was found for those thirteen to fifteen years of age. McKenzie and Rushall (1973) also increased work volume during swimming practice by using program boards on which the swimmers recorded the number of laps they had swum for different performance tasks.

The only actual research that studied the effects of contingency management in a physical education class was done by Siedentop and Hutchinson (1971). They instituted a token reinforcement program in a physical education class for multiple handicapped children (auditorially impaired, trainable retarded) in hopes of modifying attending behaviors. A reversal design including baseline 1, treatment 1, baseline 2, and treatment 2 phases was used. Praise for good behavior and reproof for undesirable behavior was used during baseline 1. In treatment 1, students who exhibited the desired behaviors were given tokens which could be exchanged for candy later in the day. Tokens were always accompanied by social praise, while inappropriate behavior was ignored. Baseline 2 conditions were the same as in baseline 1, except that disruptive behavior was ignored. Conditions during treatment 2 were the same as in treatment 1. The mean appropriate behavior exhibited rose from 70 per cent during baseline 1 to 83.5 per cent in treatment 1. It decreased to a mean of 80 per cent during baseline 2 and then rose again in treatment 2 to 93 per cent. Obviously the token program was successful in terms of increasing attending behaviors.

Summary

Studies employing contingency management procedures have been
done using numerous types of subjects in several different environmental settings. The research shows that behavior can be successfully modified in pre-delinquents, mental ward patients, exceptional children, and normal school students of all ages. It is especially significant, in terms of this study, that college courses taught by the contingency method have achieved a higher level of academic mastery and have been more enjoyed by the students than courses taught in the conventional manner. Evidence also supports the theory that the learning of skilled motor behavior can be increased with the use of this technique.

Hosston (1966) includes task teaching in his spectrum of teaching methods. In many ways this method is similar to contingency management. However, it differs in two respects. The tasks in his system are not always behavioral. Also, the focus is on the tasks and not on the consequences.

Chapter III describes the methods and procedures of this study.
CHAPTER III

METHODS AND PROCEDURES

The purpose of this investigation was to compare the effects of traditional and contingency management methods on performance in selected volleyball skills.

Comparisons were made on setting, bumping, and serving skills, a knowledge test, and an attitude rating scale. This chapter is divided into four sections. First, the design of the study is presented, including a description of the subjects, teachers, and classes involved. An explanation and procedural analyses of the two teaching methods is then given. The third section, collection of the data, describes how the tests were constructed and how they were administered. The chapter is concluded with a description of the statistical procedures utilized.

Design of the Study

Four women's beginning volleyball classes in the Basic Instructional Program at The Ohio State University were used in this study during Fall Quarter, 1972. Two female teaching assistants served as the instructors. Each instructor taught one class utilizing the contingency management method and one class using the traditional method. At the end of the term, all four classes were tested in an identical manner. Therefore, a 2 x 2 factorial design was used with
methods and teachers being the factors.

**Classes**

The four classes met twice a week for a thirty minute period for a total of fifteen class meetings. The gymnasium was open for thirty minutes prior to and following each class. Teacher A taught the 8:00 A.M. and 9:00 A.M. classes, while teacher B taught the 11:00 A.M. and 12:00 A.M. classes. As a result of randomly assigning the method to the class times, the contingency management method was used in the 8:00 A.M. and 12:00 A.M. classes, while the traditional method was employed in the 9:00 A.M. and 11:00 A.M. classes.

**Subjects**

The 119 women students who had enrolled in the four designated classes served as subjects. In order to avoid the pitfalls of using intact classes for research purposes (Baumgartner, 1969), it was attempted to register only women who had two hours of consecutive free time so that they could be randomly assigned to one of the two teaching methods. However, when registration was halfway completed, it was determined that there would not be enough subjects if this procedure were continued. Therefore, for the remainder of the registration, any woman was allowed in any class at her request.

**Teachers**

Two female teaching assistants at The Ohio State University served as instructors for this study. Teacher A had taught for three years at the university level. She had never taught volleyball, but was a rated volleyball official and had a thorough understanding of
the sport. Teacher B was in her first year at the university level, but had taught volleyball previously in the public schools.

**Teaching Methods**

The effectiveness of two teaching methods were compared: Traditional and contingency management. The primary differences between these two methods were the manner in which the student practiced the skills and the manner in which she earned her grade. It was attempted to keep other facets of the teaching-learning situation, such as explanation and demonstration of the skills and amount of playing time in the game situation, as nearly equated as possible in both methods. All lesson plans were written by the investigator. The investigator met with the two teachers continually throughout the term so that they would be thoroughly familiarized with each day's lesson and the procedures to be used.

**Traditional Method**

On the first day of class, each student was given an information sheet regarding class procedures and how their final grade would be determined (See Appendix A). They also received a packet of material containing a description of the skills to be learned, basic volleyball rules, and volleyball strategy (See Appendix B). The information in this packet was a synthesis of the content in several volleyball textbooks (Cherebetiu, 1969; Egstrom, 1966; Keller, 1968; Shondell, 1971; Slaymaker, 1970). All students were told that they would be acting as subjects in a research study. If they wished, they were free to drop the course at this time without receiving any
aversive consequences. If they chose to remain in the class, they were informed that they could not pass the course if they missed more than three class meetings or if they did not attend the final one hour testing session.

Detailed daily lesson plans which were utilized in the traditionally taught classes are in Appendix C. Generally, in the traditional method the teacher explained the skills to be learned. She then showed a Super-8 cartridge film of highly skilled volleyball players demonstrating the skills. If she wished, she then demonstrated the skills herself. Following these procedures, the students practiced the skills in individual, dual, or small group drills. After a reasonable degree of skill mastery had been attained, the students played in the game situation. The student’s grade for the course was determined in the following way; (1) 50 per cent - playing ability in the game (subjectively evaluated by the instructor); (2) 25 per cent - one written exam (See Appendix D); (3) 25 per cent - skill tests on serving, setting, and bumping (See Appendix E).

Contingency Management Method

On the first day of class each student was given an information sheet regarding class procedures and how their final grade would be determined (See Appendix F). They also received a packet of material identical to the one received by the students in the traditionally taught classes. The instructors explained the attendance requirements just as they had in the traditional classes. However, in addition to these requirements the students were told they had to pass a ten
question objective test with a score of 90 per cent or better in order to pass the course. They could take as many alternative forms of the test as they needed in order to reach this criterion. If all of these requirements were met, their grade would be determined by the number of performance tasks that they had passed by the end of the term. A list of the performance tasks involving setting, bumping, serving, and spiking skills were given to the students on the first day of classes (See Appendix G).

A performance task describes exactly what skill is to be performed, under what conditions the performance must occur, and specifies the number of times it must be done successfully (Wheeler and Fox, 1972). The tasks involved skills at varying levels of difficulty which the investigator felt students in a volleyball class should be expected to perform. A pilot study, using five female college volunteers as subjects, was done during the Summer Quarter, 1972. The purpose of this pilot study was to determine the level of difficulty of each performance task so that the tasks would be challenging to the students, yet not so difficult that the majority of students could not pass them with practice.

The contingency management classes functioned in the following manner. The skill to be learned was explained and demonstrated by the teacher in a manner identical to that used in the traditional class. Instead of being put into structured practice drills however, the students in the contingency management classes were given all the performance tasks on 5" x 7" cards. They were told they could practice
any of the tasks. As soon as they felt they could pass any task, they were to ask the teacher to watch them perform. If they performed successfully, the teacher marked it on her check sheet and the student was free to begin practicing on another task. If she was unable to pass the task, the teacher gave her individual instruction. She was then to go practice some more and could return at a later time to be tested again. When a student had difficulty with a task, the instructor suggested she work on some practice tasks. The practice tasks, which were on index cards, were tasks that were easier than the required tasks. They were used to help guide the student in her method of practicing and helped shape the final skill needed to pass a required task. The list of practice tasks are in Appendix H. There were no aversive consequences for not passing a task. The student could try as many times as necessary in order to pass it.

Detailed lesson plans for the contingency management classes are in Appendix I. As can be seen, during the latter half of the term, part of the class time was set aside for playing in the game situation.

Collection of Data

The investigator wished to evaluate the subjects' skill level in setting, bumping, and serving with skill tests that closely approximated the game situation. After a perusal of the relevant literature (Bell, 1963; Slaymaker, 1970; Thorpe and West, 1967, West, 1963), it was decided to construct new skill tests as no satisfactory tests were found. Also, a knowledge test and an attitude
rating scale were devised.

Tests

The primary criteria for a good set are a height of about twelve feet (Egstrom, 1966; Peterson, 1968) and accuracy so that the ball will be one to three feet from the net (Slaymaker, 1970). The set is most often used by the center forward in hitting the ball to a side forward so that a spike may be attempted. This means the ball should travel horizontally between fourteen and seventeen feet (Bell, 1963). A set most often is performed following a bump. This means the ball will be coming in a downward pathway toward the setter. After considering the above information, the investigator constructed the following skill test for setting.

The subject stood in the center forward position in a two foot radius circle, while the experimenter stood fifteen feet away in the center back position. The experimenter threw the ball over a ten foot high rope so that the subject could set the ball without leaving the circle. If a throw forced the subject to leave the circle, the trial was repeated. The subject was instructed to set the ball legally toward the target on the floor in the left forward position. In addition, the ball had to go over the twelve foot high rope as shown in figure 1. If the ball touched the rope, the trial was repeated. Two practice trials were given, followed by ten trials which were scored. In order to score any points the set had to be performed legally (according to the investigator's opinion) and the ball had to be set over the rope. If the ball landed on the target in the smaller circle, three points were scored. If it landed in the larger circle,
radius of small target circle \( 2\frac{1}{2} \) ft
radius of large target circle \( 4\frac{1}{2} \) ft
radius of subject circle \( 2 \) ft
rope height between S and target 12 ft
rope height between S and E 10 ft
--- --- --- --- --- --- = rope

Fig. 1. Markings and court dimensions for set skill test.

two points were earned. One point was earned if the ball landed on the target but outside the large circle.

The bump or forearm bounce pass is most often used to receive serves and is most frequently utilized by a back row player. Its purpose is to gain control of the ball and hit it to the center forward who is about two feet from the net. It should be hit at least ten feet high so the setter has time to get under it (Slaymaker, 1970).
In the bump skill test, the subject stood sixteen feet from the net in the center back position in a circle with a two foot radius. The thrower stood in the center forward position and threw the ball over a ten foot high rope. If the throw forced the subject to move outside the circle, the trial was repeated. The subject was instructed to bump the ball over the ten foot high rope so that it would land on the target on the floor in the center forward position. If the ball hit the rope, the trial was repeated. A bumped ball that landed in the smaller circle scored three points. If the ball landed in the larger circle, two points were scored. If the ball landed within the rectangular area, but outside the larger circle, one point was earned. Two practice trials were given and ten trials were scored. Figure 2 shows the size of the scoring areas and the distances involved.

The primary criteria for a good overarm serve (for beginning level players) are that it is hit low (about two feet above the net) and lands in the opponent’s back court (Bell, 1963; Shondell, 1971). The skill test designed by the investigator involved two practice trials and ten trials that were scored. The ball had to be served with an overarm motion. In order to score any points the ball had to pass over the net but below a rope which was stretched directly over the net twelve feet above the floor. If the ball touched the rope, the trial was repeated. One point was scored if the ball landed in the front half of the court. Two points were scored if it landed in the rear half of the court. Figure 3 shows how the court was marked.
Fig. 2. Markings and court dimensions for bump skill test.

radius of small target circle 3'
radius of large target circle 5'
radius of subject circle 2'
rope height between S and target 10'
--- --- --- = rope
A twenty question multiple choice test which was administered to all four classes at the end of the term was constructed by the investigator (See Appendix J). The test covered the material that had been contained in the information packet concerning rules, skill techniques, and strategy. From this test, twenty true-false test questions were constructed. This test served as the exam in the two traditional classes which counted for 25 per cent of their grade (See Appendix D). The first ten true-false questions also were used
as the first exam taken by students in the contingency management classes. The last ten questions were used as the alternative form of the test for those who did not score 90 per cent or better on the first exam.

An attitude rating scale was devised to ascertain the students' feelings toward their class (See Appendix K). Nine of the statements were adapted from the Course and Instructor Evaluation Form used at The Ohio State University. The remaining five statements were created by the investigator. The first four statements concerned various facets of the course. Five statements concerned an evaluation of the instructor. The last five statements asked for an evaluation of the teaching method used. The students were asked to answer the statements with one of five responses: Strongly agree, agree, neutral, disagree, or strongly disagree. In addition to the fourteen statements, the students in the contingency management classes were asked how they felt about the teaching method used and if they had encountered this method before.

Testing Procedures

In order to determine validity and reliability, the three skill tests were administered to two beginning womens' volleyball classes not involved in the study. Forty two students took the tests during the seventh week of the quarter. During the sixth week of the quarter, three judges evaluated each girl on a five point rating scale on bumping, serving, and setting skills. Two of the judges had taught volleyball at the university level, while one judge had taught it in
the public schools. All three judges observed and rated the students as they practiced in individual and dual drills. To increase the reliability between judge's ratings, criteria were set up to define the rating scale (See Appendix L). Validity was determined using rank order correlation. Reliability was determined by using the odd-even method. The Spearman-Brown prophecy formula was then used to estimate the coefficient for the actual test length. The validity coefficients for the set, bump, and serve tests were .70, .65, and .57 respectively. Reliability coefficients of .62, .82, and .77 were found for the set, bump, and serve tests respectively.

The knowledge test, attitude rating scale, and three skill tests were administered to all the subjects in the study during the final three class periods of the term. Prior to the testing sessions, each subject was randomly assigned to an appointment time. Six students were assigned to each appointment time. A testing station for each skill was set up. Upon entering the gym, two students were sent to each station. As soon as they completed the testing procedures at a station, they were sent to the next one. After completing all three skill tests, they were sent to the last station where the knowledge test and attitude rating scale were answered. The entire testing process took approximately one hour for each student. Prior to the testing sessions all the test administrators were trained and thoroughly familiarized with the testing procedures. The investigator collected all the data for the setting test to insure consistent evaluation. Teachers A and B collected the data for the bump test for their own two classes. Other helpers were used for the serve test.
Statistical Procedures

The data collected for each of the three skill tests and the written knowledge test were analyzed using a two-way, fixed effects, analysis of variance to ascertain if there was a difference in performance between the contingency management and the traditionally taught classes. The Chi-square test for independence was employed in analyzing the responses for each of the fourteen questions on the attitude scale to determine if there was a difference between the contingency management and traditional classes. The same procedure was also used in analyzing the difference in responses between the students in Teacher A's classes and those in Teacher B's classes. If a significant difference was found, Cramer's statistic was employed to determine the degree of relationship (Hayes, 1963).
Chapter IV is a presentation and interpretation of the statistical analyses and is divided into four sections. The first section discusses the final grade earned by students in all four classes. The second section discusses the analysis of variance data which are relevant to the first four hypotheses. Section three presents the Chi-square data which pertain to the attitude rating scale. The teachers' reactions to the contingency management method are contained in the fourth section.

Student Grade Attainment

The four classes had a combined total enrollment of 115 women. Nine of these dropped the course before the end of the quarter. Of the remaining 106, ten were excluded from the data collection procedures because they had missed more than three class periods. Also, it was not possible to test two of the subjects as they were ill at the time of testing. Table 1 shows a breakdown of the loss of subjects in each class.

The final course grades which the students earned are presented in Table 2. Nineteen of twenty two students in the 8:00 A.M. contingency class passed a sufficient number of tasks to earn a grade of A. One of the students who earned a D appeared to be very
### TABLE 1

**LOSS OF SUBJECTS DURING STUDY**

<table>
<thead>
<tr>
<th>CLASS</th>
<th>Contingency Teacher A</th>
<th>Contingency Teacher B</th>
<th>Traditional Teacher A</th>
<th>Traditional Teacher B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Started Study</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>31</td>
</tr>
<tr>
<td>Dropped</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>More than 3 absences</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Ill during data collection</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total remaining</td>
<td>22</td>
<td>22</td>
<td>26</td>
<td>24</td>
</tr>
</tbody>
</table>

### TABLE 2

**FINAL COURSE GRADE ATTAINMENT**

<table>
<thead>
<tr>
<th>GRADE</th>
<th>Contingency Teacher A</th>
<th>Contingency Teacher B</th>
<th>Traditional Teacher A</th>
<th>Traditional Teacher B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>19</td>
<td>10</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>3</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>C</td>
<td>0</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>D</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
poorly skilled and had great difficulty performing volleyball skills. However, it is also possible that she was not motivated by the contingency, i.e. the final grade. The other D student had elected to take the course on the pass/non-pass option. Halfway through the quarter, she had performed the requirements needed for a passing grade. After this point, she no longer requested the teacher to test her, although she continued attending class. In the 12:00 A.M. contingency class, twelve of the twenty two students did not earn an A grade. Eight of these twelve had also elected the pass/non-pass option. Five of the eight earned a D grade. It appears that these students only worked hard enough to get a passing grade. Once they achieved their goal, they no longer asked to be tested even though they attended class and practiced on the skills. In the 9:00 A.M. traditional class five students chose the pass/non-pass option. Of these five, one earned an A, three earned a B, and one earned a C. Four students in the 11:00 A.M. traditional class also took the class pass/non-pass. Two earned a B and two earned a C.

Knowledge and Skill Tests

The smallest number of subjects remaining in a class was twenty two. Since the two-way, fixed effects, analysis of variance computer program used required an equal number in each cell, the data of subjects were randomly dropped from the other three classes until only twenty two remained. The .05 level of significance was established for rejection of the null hypotheses. Each of the following four null hypotheses required an F of 3.97 to be rejected:
1. There is no significant difference in the performance of volleyball setting skill between the women enrolled in the traditional classes and the women enrolled in the contingency management classes.

2. There is no significant difference in the performance of volleyball bumping skill between the women enrolled in the traditional classes and the women enrolled in the contingency management classes.

3. There is no significant difference in the performance of volleyball serving skill between the women enrolled in the traditional classes and the women enrolled in the contingency management classes.

4. There is no significant difference in the performance on a volleyball knowledge test between the women enrolled in the traditional classes and the women enrolled in the contingency management classes.

For the first hypothesis concerning setting performance, the F obtained for factor A, the teacher, was 5.76. The F for factor B, the method, was 2.66, and for interaction it was 0.04. Only the F for teacher effect was significant at the .05 level so hypothesis one was not rejected. These results can be seen in Table 3.

Table 4 shows the results of the analysis of variance for hypothesis two concerning bumping performance. The F obtained for the teacher effect was 1.24; for method effect, 1.80; and for interaction effect, 0.95. As none of these F's was significant, hypothesis two was not rejected.
TABLE 3
ANALYSIS OF VARIANCE FOR THE SET SKILL TEST

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable A (Teacher)</td>
<td>177.55</td>
<td>1</td>
<td>177.55</td>
<td>5.76</td>
</tr>
<tr>
<td>Variable B (Method)</td>
<td>82.10</td>
<td>1</td>
<td>82.10</td>
<td>2.66</td>
</tr>
<tr>
<td>AB interaction</td>
<td>1.37</td>
<td>1</td>
<td>1.37</td>
<td>0.04</td>
</tr>
<tr>
<td>Error</td>
<td>2587.89</td>
<td>84</td>
<td>30.80</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2884.89</td>
<td>87</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)At the .05 level, \(F \geq 3.97\) is required for significance.

TABLE 4
ANALYSIS OF VARIANCE FOR THE BUMP SKILL TEST

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable A (Teacher)</td>
<td>27.28</td>
<td>1</td>
<td>27.28</td>
<td>1.24</td>
</tr>
<tr>
<td>Variable B (Method)</td>
<td>39.55</td>
<td>1</td>
<td>39.55</td>
<td>1.80</td>
</tr>
<tr>
<td>AB interaction</td>
<td>21.01</td>
<td>1</td>
<td>21.01</td>
<td>0.95</td>
</tr>
<tr>
<td>Error</td>
<td>1840.04</td>
<td>84</td>
<td>21.90</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1927.89</td>
<td>87</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)At the .05 level, \(F \geq 3.97\) is required for significance.

The results for hypothesis three, serving performance, are shown in Table 5. The F for the teacher effect was 1.79; for the method effect, 1.03; and for interaction effect, 0.14. This hypothesis was not rejected since the F's were not significant.

Results of the statistical procedures appear to indicate that performance on the selected volleyball skill tests did not differ
TABLE 5
ANALYSIS OF VARIANCE FOR THE SERVE SKILL TEST

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable A (Teacher)</td>
<td>20.04</td>
<td>1</td>
<td>20.04</td>
<td>1.79</td>
</tr>
<tr>
<td>Variable B (Method)</td>
<td>11.63</td>
<td>1</td>
<td>11.63</td>
<td>1.03</td>
</tr>
<tr>
<td>AB interaction</td>
<td>1.63</td>
<td>1</td>
<td>1.63</td>
<td>0.14</td>
</tr>
<tr>
<td>Error</td>
<td>940.45</td>
<td>84</td>
<td>11.19</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>973.77</td>
<td>87</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*aAt the .05 level, $F > 3.97$ is required for significance.

significantly between the students taught by the two different methods, although the directional trends of the F ratios were consistently in favor of the contingency classes. The means were generally somewhat higher in the contingency management classes (See Table 6). Teacher A's contingency class did considerably better on each skill test than her traditional class did. The same fact holds true for teacher B's classes. There are three possible explanations for these findings. One is that one method is not better than the other in increasing motor skill. Although previous research in college classes (Ferster, 1968; McMichael and Corey, 1969; Lloyd and Knutzen, 1969) has consistently shown that contingency management classes produce higher levels of learning than conventional methods, it may be that this is not the case in the learning of motor skills. Perhaps the factors underlying success in college psychology, statistics, and physics courses are different than those factors underlying success in per-
### TABLE 6

**MEANS AND STANDARD DEVIATIONS FOR KNOWLEDGE AND SKILL TESTS**

<table>
<thead>
<tr>
<th>Class</th>
<th>Set</th>
<th>Bump</th>
<th>Tests</th>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contingency</td>
<td>11.72±6.36</td>
<td>11.18±4.81</td>
<td>5.86±3.59</td>
<td>67.95±16.15</td>
</tr>
<tr>
<td>Teacher A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contingency</td>
<td>8.63±4.91</td>
<td>9.09±4.79</td>
<td>5.18±3.34</td>
<td>71.36±15.87</td>
</tr>
<tr>
<td>Teacher B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional</td>
<td>9.54±5.79</td>
<td>8.86±4.49</td>
<td>5.40±3.60</td>
<td>73.86±18.57</td>
</tr>
<tr>
<td>Teacher A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional</td>
<td>6.95±4.96</td>
<td>8.72±4.58</td>
<td>4.18±2.75</td>
<td>77.50±11.61</td>
</tr>
<tr>
<td>Teacher B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Forming sports skills and thus are influenced to a different degree by the method of teaching. Also, although prior research (Pierce, 1972; Rushall and Pettinger, 1969) has shown that quantity of physical performance has been increased using contingency management, it may be that the quality of performance is not identically increased.

A second explanation for the obtained results is that the treatment effects may not have been strong enough or have had enough time to influence the final skill performance (Weber and Lamb, 1970, p. 55). The directional trends of the F ratios tend to support this. The classes met only fifteen times for a thirty minute period. It is very possible that seven and one half hours of skill practice is not enough time to differentiate between the effects of two different teaching methods. It is the investigator's opinion that this is the most probable explanation. It is also possible that uncontrolled
factors such as the large number of contingency students taking the pass/non-pass option were responsible for no significant difference between methods being found.

The third explanation is that the three skill tests did not adequately ascertain the skill level of the subjects. Objective evaluation of sport skills has been a consistent problem to the physical educator. Although several volleyball skill tests exist, most have poor validity correlations and usually test skills under conditions quite dissimilar from the game situation (West, 1963). The skill tests devised by the investigator for this study utilized conditions similar to the game, but still obtained rather low validity correlations with judges' ratings. Both teachers, in conversations with the investigator, noted that they felt the subjects in their contingency management classes were performing better than those in the traditional classes. However, these were merely observations and not empirically substantiated.

There were no significant differences revealed in the analysis of variance applied to the written knowledge test. The F for the teacher effect was 1.09; for the method effect, 3.21; and for interaction, 0.001. These results are recorded in Table 7. The students in the traditional classes did somewhat better (See Table 6) than those in the contingency classes. Since only one test was required in these classes, it could be that the traditional classes studied harder since they only had one chance to take the test. The contingency class knew they could have extra chances if they did poorly the first time.
TABLE 7
ANALYSIS OF VARIANCE FOR THE KNOWLEDGE TEST

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable A (Teacher)</td>
<td>273.01</td>
<td>1</td>
<td>273.01</td>
<td>1.09</td>
</tr>
<tr>
<td>Variable B (Method)</td>
<td>798.01</td>
<td>1</td>
<td>798.01</td>
<td>3.21</td>
</tr>
<tr>
<td>AB interaction</td>
<td>0.28</td>
<td>1</td>
<td>0.28</td>
<td>0.001</td>
</tr>
<tr>
<td>Error</td>
<td>20876.13</td>
<td>84</td>
<td>248.52</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>21947.44</td>
<td>87</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\*At the .05 level, $F \geq 3.97$ is required for significance.

Attitude Rating Scale

A Chi-square test for independence was employed in determining the response differences between the contingency management and traditionally taught students on each of the fourteen statements. The statements and value obtained for each are given in Table 8. None of the values was significant at the .05 level. These findings indicate the students did not favor one method more than the other. Statements one and twelve were the only ones which approached significance. The traditionally taught students felt their course was more interesting than did the students in the contingency management classes. This may be because they were allowed to play in the game somewhat more often and there was more social interaction because they practiced in groups instead of alone or with one partner. Students in the contingency classes felt the grading procedure was more fair than did the students in the traditionally taught classes.
## TABLE 6

CHI-SQUARE ANALYSES FOR THE RELATIONSHIP OF STUDENT ATTITUDE RATINGS AND THE TEACHING METHOD

<table>
<thead>
<tr>
<th>Statements</th>
<th>$\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The course held my interest.</td>
<td>8.26</td>
</tr>
<tr>
<td>2. The objectives of the course were made clear.</td>
<td>2.90</td>
</tr>
<tr>
<td>3. The level of difficulty of the course was appropriate.</td>
<td>1.18</td>
</tr>
<tr>
<td>4. My course responsibilities were clearly defined.</td>
<td>2.06</td>
</tr>
<tr>
<td>5. The instructor could communicate her subject matter to the students.</td>
<td>5.83</td>
</tr>
<tr>
<td>6. The instructor possessed a thorough knowledge of her subject.</td>
<td>2.19</td>
</tr>
<tr>
<td>7. The instructor's presentation was well organized.</td>
<td>1.19</td>
</tr>
<tr>
<td>8. The instructor was prepared for class.</td>
<td>3.59</td>
</tr>
<tr>
<td>9. My instructor in this class was better than the physical education</td>
<td>4.89</td>
</tr>
<tr>
<td>teachers I have had in the past.</td>
<td></td>
</tr>
<tr>
<td>10. The method of teaching used was appropriate to this course.</td>
<td>2.56</td>
</tr>
<tr>
<td>11. My volleyball skill improved during this quarter.</td>
<td>3.69</td>
</tr>
<tr>
<td>12. The grading procedure in my class was fair.</td>
<td>8.49</td>
</tr>
<tr>
<td>13. I enjoyed my volleyball class.</td>
<td>3.74</td>
</tr>
<tr>
<td>14. My improvement in my volleyball skill is attributable to the</td>
<td>2.01</td>
</tr>
<tr>
<td>teaching method that was used.</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the 5 per cent level ($\chi^2 .05, 4 \text{ df} \geq 9.49$).
As an addition to the study, the same statistical analysis was used to determine if a significant response difference was obtained between Teacher A's classes and Teacher B's classes on each of the fourteen statements. Cramer's statistic was then used on the Chi-square values which were significant to determine the degree of relationship between the teacher and the student ratings (Hayes, 1963, p. 606). Results of these statistical procedures are in Table 9. Teacher A was rated significantly higher at the .05 level on four of the fourteen statements and at the .01 level on six of the items. It appears that good teaching is a significant factor regardless of the method used.

In addition to the above mentioned fourteen statements, the students in the contingency management classes were asked how they felt about the method of teaching used in their class. Their positive reactions are listed in Table 10. The most common positive responses were that contingency management is a good method, their skills improved, and they enjoyed the method. Some also mentioned common features of this method, such as knowledge of progress, the go-at-your-own-pace feature, and prior knowledge of the terminal goals. Table 11 presents a synthesis of the students' negative reactions toward the method. The two most common complaints were that they did not get to play the game enough and the class periods were too short. Four students felt this method created too much pressure to learn skills rather than just being allowed to play in the game. Most of their complaints are a direct result of the short
<table>
<thead>
<tr>
<th>Statements</th>
<th>$X^2$</th>
<th>Cramer's Phi</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The course held my interest.</td>
<td>17.33$^b$</td>
<td>.42</td>
</tr>
<tr>
<td>2. The objectives of the course were made clear.</td>
<td>9.43</td>
<td></td>
</tr>
<tr>
<td>3. The level of difficulty of the course was appropriate.</td>
<td>11.22$^a$</td>
<td>.34</td>
</tr>
<tr>
<td>4. My course responsibilities were clearly defined.</td>
<td>11.17$^a$</td>
<td>.34</td>
</tr>
<tr>
<td>5. The instructor could communicate her subject matter to the students.</td>
<td>20.78$^b$</td>
<td>.46</td>
</tr>
<tr>
<td>6. The instructor possessed a thorough knowledge of her subject.</td>
<td>27.00$^b$</td>
<td>.53</td>
</tr>
<tr>
<td>7. The instructor's presentation was well organized.</td>
<td>12.31$^a$</td>
<td>.35</td>
</tr>
<tr>
<td>8. The instructor was prepared for class.</td>
<td>13.72$^b$</td>
<td>.37</td>
</tr>
<tr>
<td>9. My instructor in this class was better than the physical education</td>
<td>21.39$^b$</td>
<td>.47</td>
</tr>
<tr>
<td>teachers I have had in the past.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. The method of teaching used was appropriate to this course.</td>
<td>6.41</td>
<td></td>
</tr>
<tr>
<td>11. My volleyball skill improved during this quarter.</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>12. The grading procedure in my class was fair.</td>
<td>12.15$^a$</td>
<td>.35</td>
</tr>
<tr>
<td>13. I enjoyed my volleyball class.</td>
<td>15.59$^b$</td>
<td>.40</td>
</tr>
<tr>
<td>14. My improvement in my volleyball skill is attributable to the teaching</td>
<td>3.31</td>
<td></td>
</tr>
<tr>
<td>method that was used.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$^a$Significant at the 5 per cent level ($X^2 .05, 4 df \geq 9.49$)

$^b$Significant at the 1 per cent level ($X^2 .01, 4 df \geq 13.23$).
### TABLE 10

**POSITIVE RESPONSES OF STUDENTS IN THE CONTINGENCY MANAGEMENT CLASSES**

<table>
<thead>
<tr>
<th>Positive Statements</th>
<th>#Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good method</td>
<td>13</td>
</tr>
<tr>
<td>Skills improved</td>
<td>11</td>
</tr>
<tr>
<td>Enjoyed the method</td>
<td>6</td>
</tr>
<tr>
<td>Liked knowing progress</td>
<td>1</td>
</tr>
<tr>
<td>Liked having set goals</td>
<td>1</td>
</tr>
<tr>
<td>Challenging</td>
<td>1</td>
</tr>
<tr>
<td>Different and not too difficult</td>
<td>2</td>
</tr>
<tr>
<td>Liked the go-at-your-own-pace feature</td>
<td>2</td>
</tr>
<tr>
<td>Method ok</td>
<td>5</td>
</tr>
<tr>
<td>Kept me interested</td>
<td>2</td>
</tr>
<tr>
<td>I worked harder</td>
<td>2</td>
</tr>
<tr>
<td>Liked working on my own</td>
<td>1</td>
</tr>
<tr>
<td>Easier to learn skills</td>
<td>1</td>
</tr>
<tr>
<td>Would like more gym classes to use this method</td>
<td>1</td>
</tr>
<tr>
<td>Fair way of grading</td>
<td>1</td>
</tr>
<tr>
<td>Everyone can get an A</td>
<td>1</td>
</tr>
<tr>
<td>Makes you forget about grades</td>
<td>1</td>
</tr>
<tr>
<td>Keeps everyone busy</td>
<td>1</td>
</tr>
<tr>
<td>Think elementary, junior high, and high schools . should use this method</td>
<td>1</td>
</tr>
</tbody>
</table>
class period.

TABLE 1
NEGATIVE RESPONSES OF STUDENTS IN THE CONTINGENCY MANAGEMENT CLASSES

<table>
<thead>
<tr>
<th>Negative Statements</th>
<th>#Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class too short</td>
<td>7</td>
</tr>
<tr>
<td>Should play more games</td>
<td>19</td>
</tr>
<tr>
<td>Did not like the method</td>
<td>5</td>
</tr>
<tr>
<td>Too much pressure to learn skills</td>
<td>4</td>
</tr>
<tr>
<td>Need more skill testers</td>
<td>2</td>
</tr>
<tr>
<td>Did not get to know other students in class well</td>
<td>1</td>
</tr>
<tr>
<td>Too grade oriented</td>
<td>1</td>
</tr>
</tbody>
</table>

**Teachers' Reactions to Contingency Management**

The investigator conversed with both teachers constantly throughout the study. In general, the teachers reported favorable reactions toward the contingency management method. They felt the students were far more motivated and that the final grade did function as an effective back up reinforcer. They also observed that students worked harder in the experimental classes. Often these students came early and stayed after class in order to practice the skill tasks. However, it was extremely rare to see a student in the traditional class practicing outside of regular class time. The teachers also mentioned that they, and the students, appreciated the go-at-your-own-pace feature. Fast learners could progress without being held
back and slow learners did not feel pressured by the fast learners. The teachers felt that the students liked knowing exactly what level of performance was expected of them in order to earn a specific grade. Both teachers believed that the students in the contingency management classes performed the skills better and played the game with a higher degree of skill.

The primary negative reaction toward the experimental class concerned the shortage of time. Both teachers felt very rushed as students always wanted to be tested. They would have liked to have had more and longer class periods. They also suggested that having an assistant who would help test the students on tasks could alleviate this problem.

Summary

The analysis of variance showed there was no significant difference between students taught by the traditional method and those taught by the contingency management method in performance on setting, bumping, and serving skills or on a written knowledge test. There also were no significant differences between groups in attitude toward the learning experience as determined by a Chi-square test for independence. However, the Chi-square test did show a significant difference between student ratings of the two teachers on ten of the fourteen statements.
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The main purpose of this study was to compare the performance of college women taught the skills of volleyball by the traditional method to that of women taught by the contingency management method. Student performance on setting, bumping, and serving skills and a knowledge test were compared. In addition, the students' responses on an attitude rating scale were compared.

Subjects were 115 women enrolled in four beginning volleyball classes in the Basic Instruction Program at The Ohio State University. Two of the classes were taught using the traditional method of teaching, while the other two classes were taught using the contingency management method. Two teachers instructed the classes. Each teacher taught one class using each method. Each class met fifteen times, with each class meeting being thirty minutes in length. At the end of the term, students in all four classes were tested on setting, bumping, and serving skill tests which had been devised by the investigator. The students also answered a written knowledge test and an attitude rating scale concerning their reactions toward the teaching method used in their class.

The three skill tests and the written knowledge test were analyzed using a two-way, fixed effects, analysis of variance. No significant differences were found between the traditional and contingency management classes on any of the four tests. However,
the directional trends of the skill tests data were in favor of the contingency management classes. A Chi-square test for independence was used to analyze each of the fourteen items on the attitude rating scale. There were no significant differences between the two method groups on any of the items. However, Teacher A was rated significantly higher than Teacher B on ten of the fourteen statements.

Conclusions

Based on the evidence provided by this study, with due consideration to the limitations of the investigation, the following conclusions appear to be warranted:

1. Within a thirty minute period, twice a week class meeting, eight week format, the contingency management and traditional methods of teaching do not produce significantly different performance results in volleyball setting, bumping, or serving skills at the .05 level.

2. The contingency management and traditional methods of teaching do not produce significantly different performance results on a written knowledge test when only one is given.

3. The attitude ratings toward the teaching method did not differ between the students in the contingency management classes and those in the traditionally taught classes.

4. Both students and teachers felt a thirty minute class period was too short for a volleyball class.
Recommendations

As a result of this study, the investigator recommends consideration of the following suggestions for further research:

1. As this was an initial investigation to determine if the contingency management method produces increased sport skill learning, more studies should be done to see if the results of the present study are replicated.

2. Further studies should exert tighter control in terms of students electing the pass/non-pass option.

3. Further studies should employ teachers who are similar in background and quality of teaching.

4. Further studies should use complete randomization of subjects to classes to avoid the pitfalls of using intact classes.

5. Further studies in the area of motor skill should be done in a variety of sports. It may be that the contingency management method is better suited to the learning of individual sports than team sports.

6. Further studies should use classes that meet for at least forty five minutes at a time and at least eighteen to twenty times during the term.

7. Contingency management studies, similar to this one, would be much easier to conduct if a student assistant were available to aid the teacher in testing the performance tasks. Also, peer assessment could be used.

8. Evaluative tools, such as more valid and reliable skill
tests, need to be devised in order to accurately measure the level of skill of the subjects.

9. Further studies should use playing in the game situation as a reinforcer as it may be very effective.
This class is one of four volleyball sections that is being used in a research study concerning teaching methods. Due to two holidays, this class will meet eighteen times. In order to pass the class you must attend twelve of the first fifteen class meetings. You will also be given an appointment time during one of the last three class meetings and will be required to be present at that time. You must attend your appointment time in order to receive a grade for the class. Should there be extreme extenuating circumstances, such as a broken leg or a long term illness that makes it impossible for you to meet these attendance requirements, contact your instructor immediately. In an extreme case she may waive the attendance requirement for you. However, in that case you would have to be dropped from the study though it would not lower the grade which you had earned. If you meet the attendance requirement, your final grade will be determined in the following way:

Playing ability in the game (subjectively evaluated by the instructor)  
One written exam  
Skill tests

50%  
25%  
25%
SET

The set is a technique for hitting a ball about twelve feet high, directed to one of your teammates. It should be used when the ball is above waist level and when it is the first or second hit for your team.

Ready Position

1. Feet comfortably apart with one foot about twelve inches forward of the other foot.
2. Knees slightly bent.
3. Elbows bent so that the hands are held about eight inches in front of your forehead.

Hand Position at Contact

1. Place hands on the ball with fingers spread and thumbs and forefingers touching. This should form a triangle. Pull the thumbs about two inches apart and the forefingers about four inches apart.
2. The palms of your hands should never touch the ball - only the pads of the fingers and thumbs should touch it.

Motion

The knees and elbows should be bent. As soon as the ball is contacted, the knees and elbows should extend or straighten upward. At the end of the follow through, the fingers should be pointed toward the ceiling. The ball should go about twelve feet high. In doing a set, you should position your body so that the ball is contacted when it is in front of your forehead. Always have your body facing the direction you want the ball to go.

BUMP

The bump or forearm bounce pass is used to hit a ball which is below waist level or one that is very hard hit (e.g., a hard serve). It should be hit about twelve feet high and aimed toward a teammate (a bump should not be used to hit a ball across the net). It is usually used to receive a serve or spike. In this case you should try to hit it to the center forward on your team.

Ready Position

1. Feet shoulder width apart with one foot slightly forward of the other.
2. Knees bent so you are in a semi-squat position.

**Arm Position at Contact**

1. Hands clasped together and fingers pointing toward floor.
2. Elbows straight.
3. Arms parallel to upper legs.
4. Fleshy part of forearms facing the ceiling.
5. Contact ball on fleshy part of forearms about four inches above the heels of your hands.
6. Ball should contact both forearms equally.

**Motion**

As soon as the ball contacts the forearms, straighten the knees and raise your straight arms no higher than shoulder level. Feel as if you are lifting upward with your knees - do not swing wildly with your arms! Let the ball rebound off your forearms as you lift upward.

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**UNDERARM SERVE**

The underarm serve is the easiest serve to learn. However, it is also the easiest serve for the opposing team to return.

**Motion**

Stand partially facing the net with your left foot slightly forward of your right foot. Hold the ball in your left hand, about twelve inches in front of your body, just to the right of your right hip. Swing your straight right arm directly back. With the body weight on the right foot, the left foot slides forward six to twelve inches and your weight should shift onto the left foot. Near the completion of the stride, the ball is hit out of the hand. Do not toss the ball. Hit it with the heel of the hand. Try to hit it low and forcefully. It should go no higher than five feet above the net and should land in the back part of the opponent's court. Since this is an easy serve, you should learn to hit it in any desired direction. Aiming down the sidelines and especially the back corners is very effective.

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**OVERARM SERVE**

The overarm serve is quite difficult for the opposing team to return since it is hit with more force than an underarm serve. It should be hit no higher than five feet above the net and should land in the opponents back court. With practice you should be able to hit it in any direction you desire.
Motion

Stand partially facing the net with the left foot slightly forward of your right foot. With your left hand under the ball and the right hand on top of it, toss the ball upward about two to three feet higher than your head. It should be tossed in front of your right shoulder (if you let it drop to the floor, a good toss should land about eight inches in front of your right foot). As soon as the ball is tossed, start shifting your weight forward onto your left foot. The ball should be contacted slightly in front of your right shoulder with your right arm straight. Hit the ball with the heel of your hand. Your hand should follow through in the direction you wish the ball to go.

SPIKE

The spike is a hard, downward hit into the opponent's court. It is the most reliable way to win points. Since it is a downward hit, the ball must be hit when it is higher than the net. This means you must be able to jump high enough that your hand is above the ball (which is above the net). The spike is easier to accomplish when you are in the left forward position, but you can do it from the right or center forward positions.

Approach

Start your approach to the net after the ball has been set. Take a three step approach from about a 45 degree angle to the net. Use a two foot take-off for the jump. This will help keep you from touching the net with your body. As you plant both feet on the floor for the take-off, bend both knees and swing both arms upward above your head - this gives you a higher jump.

Contact

At the peak of your jump, the right arm should be bent and behind your shoulder. As you swing at the ball, the arm should straighten so that the ball is hit when it is well above you and slightly in front of your spiking shoulder (this increases the force of the hit). The ball should be hit with the heel of your open hand. Keep your wrist firm as you contact the ball. After the ball is hit, be careful that your follow through does not result in your body touching the net. When you land on the floor, be sure your knees are bent. This helps absorb the force of landing and also aids you in keeping your balance.

VOLLEYBALL STRATEGY

A good team always attempts to use a bump-set-spike pattern.
This means that the person receiving the serve should hit the ball (usually using the bump) to the center forward. The bump should be about twelve feet high so that the center forward has time to move under the ball if it is not directed exactly to her. The center forward should set the ball (about twelve feet high) to the left forward who tries to spike the ball hard and to an open space in the opponent's court. The set to the left forward should be between one to two feet away from the net. It is possible for the right or center forwards to spike, but it is more difficult for them to do so. However, both left and right forwards should stand several feet away from the net while waiting to see if a set will come to them. This gives them enough space to take a three step approach in preparation for executing the spike.

Most serves come to the middle and back part of the court. Because of this, the right and left forwards should step back a few feet from their normal positions when the other team is serving so that the court is better covered.

Teamwork is the most important thing in volleyball. Rarely does a ball come directly to you. This means you must move fast so you can get directly in front of the ball. Often a ball will come between two players. To avoid confusion and possible collisions, always call "mine" when you plan to hit the ball. Don't be afraid to move! The best team is one whose team members are constantly moving. Not only must you move to get to the ball, but you will also need to move to back up a teammate. For example, if a serve is hit to the right forward, the right back should move up to within about four feet of her in case she misses it. It is also important that the players who are not hitting the ball always face the ball and be ready to move fast. If you are hitting the ball, you should always face the direction in which you want the ball to go.

VOLLEYBALL RULES

There are six players on a team - left forward, center forward, right forward, left back, center back, and right back.
Only the serving team can win points. If the serving team does not win a point, "side out" is called and the other team gets to serve. A person serves as long as she gets points. After each team has had one turn at serving, when a side out is called, the team about to serve must rotate in a clockwise direction. The server (the right back) must serve from behind the end line and be within ten feet of the right side line.

There are several fouls in volleyball. When a foul occurs, a point or side out is called depending on which team was serving. The following are fouls:

**Serving:**
1. Stepping on or over the endline before the ball is hit (foot fault).
2. The served ball touching the net before it crosses the net.
3. Anyone touching the served ball, other than the server, before it crosses the net.
4. Serving a ball out of bounds.

**Hitting the ball illegally:**
1. Pushing, lifting, throwing or slinging (letting the ball momentarily rest in the hands).
2. A player hitting the ball twice in succession.
3. A team hitting the ball more than three times before it crosses the net.
4. Hitting the ball with any part of the body below the waist.
5. Catching the ball, either on or off the court, and calling it out.
6. Using an open handed, underhanded hit (you must use the bump for a low ball).

**Plays illegally at net:**
1. Touching the net with any part of the body while the ball is in play. If the ball is driven into the net with such force that it causes the net to contact a player on the opposing team, no foul is called, and the ball continues in play.
2. Stepping over the center line (you may step on it).
3. Reaching over the net to hit a ball (part of the ball must be over the net before you are allowed to hit it).
4. A back line player spiking.

A double foul is called when players on both sides commit a foul on the same play. In case of a double foul, the play shall be repeated.

A ball that lands on a boundary line is good.

You are allowed to hit a ball while you are out of bounds. However, the ball must cross the net between the net markers.
If two players on the same team hit the ball simultaneously, it is counted as one hit for the team. Either player may hit it next.

A game is 15 points or 8 minutes, whichever comes first. A team must win by at least two points. That is, the final score cannot be 15–14 or 16–15. Play must continue until a team is two points ahead. A match is two out of three games.
APPENDIX C
LESSON PLANS FOR THE TRADITIONALLY TAUGHT CLASSES

Lesson #1

1. Give out information packet and class procedures sheet. Have them read it in class. Answer questions until they fully understand how the class will function.

2. Introduce setting
   A. Show cartridge film
   B. Explain and demonstrate the set.
   C. Practice
      a. Have them throw the volleyball upward at least five feet above their head and catch it in front of their forehead with the proper hand position and with their knees bent. Do this 4 or 5 times.
      b. Have them stand about fifteen feet from a partner. The partner should throw the ball high toward them. Then the receiver should catch the ball in front of her forehead using the correct hand position and with the knees bent. Do this 3 or 4 times.
      c. Have them throw the ball upward a couple of feet, then set it once, and then catch it. Emphasize a high hit. Do it 5 times.
      d. Have them get in pairs or groups of threes and set the ball back and forth.
      e. Have five or six in a circle and have them set it across it. Have them call "mine".

Lesson #2

1. Review set
   A. Position self so ball comes toward forehead
   B. Hand position
   C. Bend knees and elbows - then extend toward ceiling
   D. Always face direction you intend to set.

2. Practice set
   A. Self setting higher than basketball rim
   B. Partner set
   C. Circle setting with one person in center

3. Introduce bump (forearm pass)
   A. Show cartridge film
   B. Explain and demonstrate the bump.

4. Practice the bump
   A. Get in ready position (Knees bent and arms straight). Go
through the bump motion five times. Be sure to extend upward with knees and that arms stay straight.
B. Toss the ball up, bump it once as high as the basketball rim, then catch it. Repeat five or six times.
C. Have a partner throw the ball easy to you, then bump it back to her. It should go higher than the basketball rim.
D. Do C again but have partner throw the ball hard.
E. Circle bump.

Lesson #3

1. Have them read the rules and strategy sheets as they will play a game next time.

2. Set practice - seven minutes
   A. Partner set
   B. Circle set with one person in the center
   C. Line set - go to end of own line after setting ball

3. Bump practice - seven minutes
   A. Partner bump
   B. Circle bump

4. Introduce underarm serve
   A. Explain and demonstrate
   B. Practice - everyone serve from behind the end lines at same time.

Lesson #4

1. Introduce game play and rules in the information packet. Show position play.

2. Have half the class play on one court, while the other half do the practice drills below. Change groups halfway through the period.
   A. Circle set - have contest to see which circle has the most consecutive good sets.
   B. Circle set with one person in the center
   C. Bump with a partner throwing the ball down and hard.
   D. Have the thrower alternate throwing down and throwing high so the receiver must alternate using the bump and the set.
   E. Do wall setting above the eight foot line.

Lesson #5

1. Introduce spike
   A. Show cartridge film
   B. Explain and demonstrate the three step approach and two foot take off with knees bent and swinging both arms down and back and then swinging both arms upward.

2. Practice
   A. Do a jump using a two foot take off from a stationary position.
by bending and extending the knees. Do five jumps.

B. Do a jump using a two foot take off from a stationary position by bending and extending the knees. As the knees are bent, swing both arms downward and back. As you jump, swing both arms upward and reach for the ceiling. Do five times.

C. Take a three step approach and jump using a two foot take off swinging both arms up. Do five times.

D. Hold the ball on your left hand. Hit it with the heel of your right hand (palm open) and make it bounce as high as possible off the floor. Catch it before it touches the floor again. Do it five times.

E. Lower the nets until you can touch the top of it with your finger tips. Have a student stand on a chair next to the net and hold a ball on her open palm just above the net and at least one foot away from the net. Take a three step approach and two foot take off and spike the ball hard and down.

F. With the low net, have a student toss the ball up four feet above the net and about one foot away from the net. With a three step approach and a two foot take off, spike the ball.

G. Repeat F with the nets at normal height.

H. Have someone set the ball and have the students spike.

For E, F, G, and H have the students work in groups of seven. Have them spike from the left forward position.

Lesson 46

1. Notify the students the number of absences they have accumulated.

2. Introduce overarm serve
   A. Show cartridge film
   B. Explain and demonstrate
   C. Practice
      a. Stand three feet from the net with your right side toward the net. Toss the ball up (left hand under the ball and right hand on top of the ball) so that it goes as high as the top of the net and lands on a sheet of paper (8½x11") which is placed so its center is about twelve inches in front of your right foot and in line with your right shoulder. Your left foot should be about twelve inches forward of your right foot. Do ten times.
      b. Stand halfway between the net and the end line. Serve into other court.
      c. Gradually move back and serve until you can serve over the net from behind your end line.

3. Practice spike from the left forward position with net at normal height.
   A. Spike a tossed ball
   B. Spike a ball that has been set.
Lesson #7

1. Game play
   A. Put twelve students on the court in playing positions and have the rest of the class watch.
      a. Show serve reception positions with the right and left forwards back behind the ten foot line.
      b. Emphasize the bump-set-spike pattern. The first hit should go to the center forward who should set the ball to a side forward. The side forward should attempt a spike whenever possible.
      c. Have them play a few minutes. Correct their playing positions and call illegal hits.

   B. Have the other students start a game on the other court. You should move from court to court giving them help.

Lesson #8

1. Set practice
   A. Partner set
   B. Line set
   C. Circle set contest

2. Bump practice
   A. Partner throws ball down and hard - other person bumps it back to her.

3. Serve practice
   A. Everyone lines up on the end line - emphasize hitting the ball to the opponents back court and having the ball pass not more than five feet above the net.

4. Play games for fifteen minutes.

Lesson #9

1. Have each student fill out a notecard with the following information: Name, phone number, and class morning schedule.

2. Five minutes of overarm serve practice

3. Play games - you should start watching them play and begin giving them a subjective grade for playing ability.

Lesson #10

1. Notify students of the number of absences they have accumulated.

2. Half of the class plays a game while you skill test the other half on setting, bumping, and serving. Change groups halfway through the period.
Lesson #11

1. Announce the test they will take over the information packet.
2. Complete skill tests.

Lesson #12

1. Overarm serve practice for five minutes
2. Play game - rate them on playing ability

Lesson #13

1. Give written test
2. Play game - rate their playing ability

Lesson #14

1. Return tests and go over them
2. Play games

Lesson #15

1. Play games
2. Tell them their quarter grade
3. Give out the appointment times. Remind them they must attend the appointment time in order to receive a grade on their grade card.
Game play
A. Put twelve students on the court in playing positions and have the rest of the class watch.
   a. Show serve reception positions with the right and left forwards back behind the ten foot line.
   b. Emphasize the bump-set-spike pattern. The first hit should go to the center forward who should set the ball to a side forward. The side forward should attempt a spike whenever possible.
   c. Have them play a few minutes. Correct their playing positions and call illegal hits.

B. Have the other students start a game on the other court. You should move from court to court giving them help.

Set practice
A. Partner set
B. Line set
C. Circle set contest

Bump practice
A. Partner throws ball down and hard - other person bumps it back to her.

Serve practice
A. Everyone lines up on the end line - emphasize hitting the ball to the opponents back court and having the ball pass not more than five feet above the net.

Play games for fifteen minutes.

Have each student fill out a notecard with the following information: Name, phone number, and class morning schedule.

Five minutes of overarm serve practice

Play games - you should start watching them play and begin giving them a subjective grade for playing ability.

Notify students of the number of absences they have accumulated.

Half of the class plays a game while you skill test the other half on setting, bumping, and serving. Change groups halfway through the period.
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1. Announce the test they will take over the information packet.
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Lesson #13
1. Give written test
2. Play game - rate their playing ability

Lesson #14
1. Return tests and
2. Play games

Lesson #15
1. Play games
2. Tell them that
3. Give out the appointment time to them they must attend the grade on their grade card.
CLASS EXAM

TRUE-FALSE

1. A ball that lands on a boundary line is not good.
2. A serve which touches the net as it goes over is dead and side out is called.
3. If two players on the same team contact the ball simultaneously, it is counted as one hit for their team.
4. It is legal to hit the serve with your fist.
5. The bump pass is primarily used to hit the ball to the opponent's back court.
6. Rotation is in a counterclockwise direction.
7. In doing a set, only the pads of the fingers and thumbs should touch the ball.
8. In doing a set, at the end of the follow through, the arms should be extended toward the ceiling.
9. In doing a bump, the elbows should be slightly bent at contact with the ball.
10. In serving, you should try to have the ball land in the front part of the opponent's court.
11. In doing a bump, the knees should be straight throughout the entire motion.
12. If the server makes a bad toss, she may catch it and then toss the ball up again.
13. The server may serve from any point behind the end line.
14. It is legal to step over the center line.
15. If you can jump high enough, it is legal to spike the ball when it is still on the other side of the net.
16. Usually an illegal hit occurs if you try to set the ball when it is behind your head.
17. A team may win a game with a score of 17-15.
18. A well-performed spike is one which is hit hard and to an open space in the opponent's court.
19. When receiving the serve, the right and left forwards should stand several feet away from the net.
20. If a serve goes to the right back, she should try to hit the ball to the right forward.
APPENDIX E
CLASS SKILL TESTS

Set Test

The experimenter throws the ball over a twelve foot high rope. The subject is to set the ball over the rope into the circle. One point is scored if the subject sets the ball over the rope and it lands in the circle. There are two practice trials and five trials which are scored.

Bump Test

The bump test was set up similar to the set test. However, the scoring circle was nine feet in diameter. Also, two points were scored if the ball landed in the circle and one point was scored if the ball only went over the rope.

Serve Test

In the serve test the subject had to perform an overarm serve. There were two practice serves and ten that were scored. One point was scored if the serve went between the net and a rope which was stretched directly above the net. The rope was twelve feet above the floor.
APPENDIX F
PROCEDURES IN CONTINGENCY MANAGEMENT CLASSES

This class is one of four volleyball sections that is being used in a research study concerning teaching methods. Your class is being taught using the contingency management method. A list of skill performance tasks will be given to you. The tasks are listed in order going from easy to more difficult. After the instructor has explained and shown you how to do a particular skill, such as the set, you will be allowed to practice that skill on your own, using the list of tasks to guide you. Whenever you feel you can pass a task, ask the instructor to watch you. If you pass the task, she will record it and you may then begin practicing for the next task. If you fail to pass the task, you may go practice it and try to pass it at a later time. The instructor will allow you to try to pass the task as many times as you wish. There is no penalty for not passing a task. Anytime you feel you are not improving your skill, ask the instructor to help you.

The list includes tasks involving the set, bump, underarm serve, overarm serve, and spike. You will be given a written explanation of how to perform each skill and a list of the tasks to be performed. As soon as the teacher has taught a skill you may begin working on the tasks involving that skill. You do not have to pass all the set tasks before you start to work on the bump tasks. For example, by the end of the third class meeting, you may be practicing or being tested on tasks involving the set, bump, and underarm serve.

Due to two holidays, this class will meet eighteen times. In order to pass this course you are required to attend twelve of the first fifteen class meetings. You will also be given an appointment time during one of the last three class meetings and will be required to be present at that time. You must attend your appointment time in order to receive a grade for the course. Should there be extreme extenuating circumstances, such as a broken leg or a long term illness that makes it impossible for you to meet these attendance requirements, contact your instructor immediately. In an extreme case she may waive the attendance requirement for you. However, in that case you would have to be dropped from the study, though it would not lower the grade which you had earned. One other requirement in order to pass this course is to have a minimum score of 90% on a ten question test. If you do not attain this score the first time, you will be allowed to take alternate versions of the test until you do attain a score of 90%. If you meet the attendance and knowledge test requirements, your final grade will be determined by the number of tasks that you have passed by November 27. The grading scale below will be used:

A 13-15
B 11-12
C 9-10
D 7-8
APPENDIX G
PERFORMANCE TASKS

SETTING TASKS

1. Toss the ball up into the air, then set the ball against the wall above the eight foot line using a legal set up (no holding, pushing, or throwing allowed). You must set the ball four consecutive times without it touching the floor, being caught, or touching the wall below the eight foot line. You may stand any distance from the wall. Have the instructor test you.

2. Throw the ball up about two feet above your head, then set it legally four consecutive times at least as high as the basketball rim. Have the instructor test you.

3. Stand ten feet from the rope. Toss the ball up about two feet above your head and set it legally over the rope. It must land in the circle on three consecutive attempts. Have the instructor test you.

4. Stand facing the rope, ten feet from it. Have a partner, who is on the other side of the rope standing in the circle, throw a ball to you over the rope. Set the ball over the rope. It must land on the floor within the circle 3 out of 4 times. Have the instructor test you.

BUMP TASKS

5. Toss the ball about two feet above your head, then bump it higher than the basketball rim four consecutive times. Have the instructor test you.

6. Stand about 15 feet from your partner. She should throw the ball downward and hard to you, aiming between your waist and knees. Bump the ball higher than the basketball rim 2 out of 3 times. Have the instructor test you.

7. Stand ten feet from the rope. Have a partner stand on the other side of the rope about ten feet from it. She should throw the ball over the rope to you. Bump the ball back over the rope 2 out of 3 times. Have the instructor test you.

8. Stand about 15 feet from your partner. She should throw the ball downward and hard to you, aiming between your waist and knees. Bump the ball higher than the basketball rim. Your partner must catch the ball before it touches the floor. Do this 2 out of 3 times. Have the instructor test you.

9. Stand 10 feet from the rope. Have a partner stand on the other
side of the rope in the circle. She should throw the ball over the rope to you. Bump the ball over the rope so that it lands on the floor within the circle. Do this 2 out of 3 times. Have the instructor test you.

UNDERARM SERVE

10. Stand behind the end line. Serve 2 out of 3 balls over the net but below the rope. Have the instructor test you.

OVERARM SERVE

11. Serve 2 out of 3 times into the court from behind the end line. Have the instructor test you.

12. Serve 2 out of 3 times into the court from behind the end line. The ball must go between the rope and the top of the net. One ball must land on the right half of the court and one ball must land on the left half of the court. Have the instructor test you.

SPIKE

13. Face the wall and stand about 15 feet from it. Toss the ball up and hit it with the heel of your hand so that it hits the floor about six feet from the wall. As it rebounds from the wall, hit it again so that it hits the floor and then rebounds off the wall. Hit it once again and then catch it as it rebounds from the wall (in all, you must hit the ball three times). Have the instructor test you.

14. With the low net, have your partner toss the ball up four feet above the net and about one foot away from the net. With a three step approach and a two foot take-off, spike the ball down and hard 2 out of 3 times into the opposite court. Have the instructor test you.

15. With the net at normal height, have your partner toss the ball up four feet above the net and about one foot away from the net. With a three step approach and a two foot take-off, spike the ball down and hard 2 out of 4 times into the opposite court. Have the instructor test you.
PRACTICE TASKS

SETTING

1. Throw the volleyball upward at least five feet above your head and catch it in front of your forehead with the proper hand position and with your knees bent. Do it properly five times.

2. Stand about fifteen feet from a partner. She should throw a high, easy ball (about twelve feet high) to you. Catch the ball in front of your forehead using the correct hand position and with your knees bent. Do it correctly three out of four times.

3. Stand about fifteen feet from a partner. Have her throw a high, easy ball about three feet to your side (sometimes to your right side and sometimes to your left side). Move over directly in front of the ball and catch it in front of your forehead with the proper hand position and with your knees bent. Do it properly three out of four times.

4. Throw the ball about two feet above your head, then set it up using the correct hand and body position and extend your knees, arms, and fingers toward the ceiling. Then catch the ball. Do this three out of four times correctly.

BUMPING

5. Get in the ready position (knees bent and arms straight). Go through the bump motion ten times. Be sure you extend upward with your knees and that your arms stay straight.

6. Toss the ball about two feet above your head, bump it once as high as the basketball rim, then catch it. Be sure your arms are straight and the ball rebounds off your forearms. Extend up with your knees. Do this ten times.

7. Stand about fifteen feet from a partner. She should throw a high, easy ball (about twelve feet high) about three feet to your side (she should throw sometimes to your left side and sometimes to your right side). Bump the ball back to her. The ball must go at least as high as the basketball rim. Be sure you move directly in front of the ball - don't reach out to the side. Do this two out of three times.

UNDERARM SERVE

8. Stand halfway between the net and the end line. Serve two out of three balls over the net into the opposite side.
9. Stand behind the end line. Serve two out of three balls over the net into the opposite side.

OVERARM SERVE

10. Stand three feet from the net with your right side toward the net. Toss the ball up (left hand under the ball and right hand on top of the ball) so that it goes as high as the top of the net and lands on a sheet of paper which is placed so its center is eight to twelve inches in front of your right foot and in line with your right shoulder. Your left foot should be about twelve inches forward of your right foot. Do this three out of four times.

11. Stand halfway between the net and the end line. Serve two out of three times into the court.

12. Move back three steps and serve into the court two out of three times.

SPIKE

13. Do a jump using a two foot take off from a stationary position by bending and extending your knees. Do five jumps.

14. Do a jump using a two foot take off from a stationary position by bending and extending your knees. As you bend your knees, swing both arms downward and back. As you jump up, swing both arms upward and reach for the ceiling. Do five jumps.

15. Take a three step approach and jump using a two foot take off swinging both arms upward. Do five jumps.

16. Hold the ball in your left hand. Hit it with the heel of your right hand (palm open) and make it bounce as high as possible off the floor. Catch it before it touches the floor again. Do this five times.

17. Toss the ball up above your arm reach and hit it downward as hard as possible with the heel of your hand. Use your entire body. Catch the ball before it touches the floor again. Do this five times.

18. Face the wall and stand about fifteen feet from it. Toss the ball up and hit it with the heel of your hand so that it hits the floor about six feet from the wall. Catch the ball as it rebounds from the wall before it hits the floor again. Do this five times.
19. Lower the nets until you can touch the top of it with your finger tips. Have a partner stand on a chair next to the net and hold a ball on her open palm just above the net and at least one foot away from the net. Take a three step approach and two foot take off and spike the ball hard and downward two out of three times into the opposite side.
APPENDIX I
LESSON PLANS FOR THE CONTINGENCY MANAGEMENT CLASSES

Lesson #1

1. Give out information packet and class procedures sheet. Have them read it in class. Answer questions until they fully understand how the class will function.

2. Introduce setting
   A. Show cartridge film
   B. Explain and demonstrate the set

3. Practice the set using the task cards. Test them on the tasks upon request.

Lesson #2

1. Review set
   A. Position self so ball comes toward forehead
   B. Hand position
   C. Bend knees and elbows – then extend toward ceiling
   D. Always face direction you intend to set

2. Allow ten minutes for practice on set and testing the tasks

3. Introduce forearm pass (hump)
   A. Show cartridge film
   B. Explain and demonstrate the bump

4. Practice the bump tasks and test them upon request

Lesson #3

1. Introduce underarm serve
   A. Explain and demonstrate

2. Practice serve using the task cards and test them upon request

3. They may also practice and be tested on the set and bump tasks.

Lesson #4

1. Introduce game play and rules in the information packet. Show position play.

2. Have half the class play on one court while the other half are practicing or being tested on the other court. After half the period is over, change groups.
Lesson #5

1. Introduce spike
   A. Show cartridge film
   B. Explain and demonstrate the three step approach and two foot take off with knees bent and swinging both arms down and back and then swinging both arms upward. Explain how to do task #13.
   C. Allow practice using the spike tasks for ten minutes.

2. Allow practice and testing on any tasks during the rest of the class period.

Lesson #6

1. Notify students how many absences they have accumulated.

2. Introduce overarm serve
   A. Show cartridge film
   B. Explain and demonstrate

3. Practice the overarm serve tasks for ten minutes. Test them upon request.

4. Allow practice and testing on any of the tasks for the remainder of the class period.

Lesson #7

1. Game play
   A. Put twelve students on the court in playing positions and have the rest of the class watch.
      a. Show serve reception positions with the right and left forwards back behind the ten foot line.
      b. Emphasize the bump-set-spike pattern. The first hit should go to the center forward who should set the ball to a side forward. The side forward should attempt a spike whenever possible.
      c. Have them play a few minutes. Correct their playing positions and call illegal hits.
   B. Have the other students start a game on the other court. You should move from court to court giving them help.

Lesson #8

1. Half the students play a game on one court while the other half are practicing and being tested on the other court. When the period is half over, have the groups change.

Lesson #9

1. Have each student fill out a notecard with the following information:
Name, phone number, and class morning schedule.

2. Have half the students play games while the other half practice or are tested on tasks.

Lesson #10
1. Practice or test on tasks during the entire class period.

Lesson #11
1. ANNounce the test they will take over the information packet.
2. Have half the students play games while the other half practice or are tested on tasks.

Lesson #12
1. Allow them to play games or practice on tasks - whichever they desire.

Lesson #13
1. Give written test.
2. Allow them to play games or practice on tasks - whichever they desire. Grade tests at this time and return them.

Lesson #14
1. Allow them to play games or practice on tasks - whichever they desire.
2. Give alternate version of test to those who did not achieve 90% or better on the first test.

Lesson #15
1. Allow them to play games or practice on tasks - whichever they desire.
2. Give out the appointment times. Remind them they must attend the appointment time in order to receive a grade on their grade card.
I. Multiple Choice. Read all the answers before making a choice.
Pick the one best answer.

1. Which of the following statements is true?
   a. Rotation is in a clockwise direction.
   b. A ball that lands on a boundary line is not good.
   c. A side out is called if a served ball touches the top of the net.
   d. a and c
   e. All of the above

2. Which of the following statements describes the proper techniques for performing a set?
   a. Only the pads of the fingers and thumbs should touch the ball.
   b. At the end of the follow through the arms should be extended toward the ceiling.
   c. The knees should be bent before the ball is contacted.
   d. b and c
   e. All of the above

3. Which of the following statements is correct in describing the proper technique that should be used in performing the bump?
   a. The elbows should be slightly bent at contact with the ball.
   b. The knees should be straight throughout the entire motion.
   c. You should always be directly in line with the oncoming ball so that you can hit it when it is in front of you rather than when it is to your side.
   d. a and c
   e. All of the above

4. Which of the following statements is true?
   a. The primary use of the bump is to hit the ball over the net to the opponent’s back court.
   b. The primary use of the set is to hit the ball to your teammate so she can attempt a spike.
   c. The best kind of serve is one which is hit high and to the middle of the opponent’s court.
   d. a and b
   e. None of the above

5. Which of the following statements is most accurate?
   a. If two players on the same team contact the ball simultaneously, it is counted as two hits for their team.
   b. If two players from the same team contact the ball simultaneously, neither one may hit the ball next.
   c. Whenever possible, a team should attempt to use the bump-set-spike pattern.
   d. a and c
   e. All of the above
6. Which of the following is an illegal serve?
   a. Server hits the ball with her fist.
   b. Server throws the ball up, swings at and completely misses the ball.
   c. Server steps on the end line on her follow through after she contacted the ball.
   d. Server stands behind the end line, at the center of the court, as she contacted the ball.
   e. All of the above

7. Which of the following is not a foul?
   a. Touching the net on a spike.
   b. Hitting the ball when standing outside the court boundaries.
   c. Stepping over the center line.
   d. Holding the ball momentarily.
   e. Reaching over the net to spike the ball.

8. Which of the following will probably result in a thrown or lifted ball?
   a. Using an open handed pass to hit a low ball.
   b. Facing in a direction other than that of your intended hit.
   c. Hitting the ball from a point behind your head.
   d. Using a set when a hard hit serve comes at your waist.
   e. All of the above

9. A game is completed by:
   a. 11 points or 8 minutes, whichever comes first.
   b. 21 points
   c. Neither of the above

10. A team, in order to win a game, must be:
    a. At least one point ahead.
    b. At least two points ahead.
    c. Either of the above.

11. When spiking, it is best to:
    a. Hit the ball hard at a player on the opposing team.
    b. Hit the ball hard and to an open space.
    c. Hit the ball to the center of the opposing court.

12. When receiving a serve:
    a. The entire front row should stand one arms length from the net.
    b. The left and right backs should move forward three feet.
    c. The left and right forwards should move back several feet from the net.

II. Indicate the official's decision in the following situations, using the key letters. There is only one best answer to each question. Assume that no conditions exist other than those stated in the question.
13. A player on the receiving team leaves the court to hit the ball. The returned ball passes over the net between the net markers and lands on the opponent's side line.

14. On the service, the ball touches the top of the net and lands on the boundary line of the receiving team's court.

15. The spiker's hand goes over the net on the follow through of the spike. His hand does not touch the net. The receiving team is unable to return the ball.

16. The ball comes into the receiving team's court. Players A and B hit it simultaneously, then player C sets the ball to player B who spikes it over the net. The spike is not returned.

17. A person on the receiving team spikes the ball when it is directly above the net. The spike is hit at the feet of the opposing center forward and is not returned.

18. A player on the serving team spikes the ball at the feet of the left forward of the receiving team. The ball is not returned by the receiving team. On the spike, the ball touched the top of the net.

19. A player on the receiving team sees that the serve is going to land out of bounds, so she catches it and calls "out".

20. A player on the receiving team touches the net as she spikes. The opposing team is unable to return the spike.
COURSE AND INSTRUCTOR EVALUATION FORM

Instructions: Your cooperation in the completion of this form will provide your instructor with a clearer picture of student opinion. Respond frankly to all statements. Your name is not requested on this form to assure anonymity. Please circle the response which most accurately describes your feeling about the statement.

SA  Strongly agree  
A   Agree  
N   Neutral or no feeling  
D   Disagree  
SD  Strongly disagree

1. SA A N D SD The course held my interest.
2. SA A N D SD The objectives of the course were made clear.
3. SA A N D SD The level of difficulty of the course was appropriate.
4. SA A N D SD My course responsibilities were clearly defined.
5. SA A N D SD The instructor could communicate her subject matter to the students.
6. SA A N D SD The instructor possessed a thorough knowledge of her subject.
7. SA A N D SD The instructor’s presentation was well organized.
8. SA A N D SD The instructor was prepared for class.
9. SA A N D SD My instructor in this class was better than the physical education teachers I have had in the past.
10. SA A N D SD The method of teaching used was appropriate to this course.
11. SA A N D SD My volleyball skill improved during this quarter.
12. SA A N D SD The grading procedure in my class was fair.
13. SA A N D SD I enjoyed my volleyball class.
14. SA A N D SD My improvement in my volleyball skill is attributable to the teaching method that was used.

Have you ever had a class before that was instructed similar to this volleyball class?______

How did you feel about the method of teaching used in this class?
APPENDIX L
EVALUATIVE CRITERIA FOR RATING SKILL LEVEL

Setting

1 Legal hit less than 50% of time
   Usually less than ten feet high
   Partner cannot get to it to hit it back

3 Legal 75% of time
   Ten to twelve feet high
   Partner has to move two steps to hit it

5 Always legal hit
   Twelve feet or higher
   Partner does not have to move more than one step to hit it

Bumping

1 Less than ten feet high
   Partner cannot get to ball to hit it

3 Ten to twelve feet high
   Partner has to move more than two steps to hit the ball

5 Twelve to twenty feet high
   Partner does not have to move more than one step to hit it

Serving

1 Ball in bounds less than 30% of time
   Ball goes very high (near ceiling)
   Ball lands in front half of court

3 Ball in bounds about 60% of time
   Serve lands in back half of court usually

5 Ball in bounds about 90% of time
   Serve lands in back half of court usually
   Serve usually goes no higher than five feet above the net
LIST OF REFERENCES
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Siedentop, D. and Hutchinson, L. 1971. "Token Reinforcement in a Physical Education Class for Multiple Handicapped Children". Unpublished Research, Department of Physical Education, The Ohio State University, Columbus, Ohio.


