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A STUDY MEASURING THE EFFECTIVENESS OF VISUAL RECALL
PROVIDED BY A VIDEOTAPE RECORDER IN TEACHING
GOLF PERFORMANCE SKILLS

A Thesis
Presented to
the Graduate Faculty
Central Washington State College

In Partial Fulfillment
of the Requirements for the Degree
Master of Education

by
Rodney G. Morrow
August, 1968

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APPROVED FOR THE GRADUATE FACULTY

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Robert N. Irving, Jr.

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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

Instructional television has been used in education since Iowa State College developed an educational television station and began to broadcast in February, 1950. Since then, a considerable amount of research in instructional television has been stimulated by a predicted and actual shortage of competent teachers and by the need to educate a rapidly growing population which has to learn more than ever before because of the explosion of human knowledge. Research has shown that instructional television has excellent distributive powers which could reduce a shortage of experienced teachers and offer courses that otherwise couldn't be available.

Since 1956 when the first videotape recorder was invented, a new and unlimited area in instructional television has emerged. As early as 1958 the videotape recorder was used in sports at a cost of \$75,000. Since then, improved techniques and production methods have drastically lowered the cost. Now that the cost is within reach of educational institutions, educators are finding a variety of uses for the videotape recorder: recording student teachers, recording physical education activities, and recording top-notch teachers' lectures.

There have been many articles written explaining the uses of videotape recorders leaving no doubt that a videotape recorder is an invention that will find many innovative uses in education. Yet there could be some doubt about its use as an effective instructional tool. Is a video replay of a student's performance skills with an instructor's comments more valuable to the student than an instructor's comments without a video replay? Will video replays increase students' performance skills or will students improve as much without the video replays?

Is the videotape recorder an instructional tool to be used in our schools or is it just another electronic gadget finding its way into our schools with no real instructional value? This is the important question which must be answered. Although articles have been written reporting the outcomes of experiences by various institutions, few are reports of research.

There is need to measure the effectiveness of the videotape recorder as an analyzing and instructional tool.

I. THE PROBLEM

Statement of the Problem

This is a study to determine if beginning golf students who view a videotape replay of themselves practicing a full swinging golf shot with an instructor's critique will improve their golf performance skills

significantly more than students whose full swinging golf shot is videotaped but who are not exposed to a videotape replay of their performance; however, they were provided an instructor's critique.

Purpose of the Study

During Fall Quarter, 1966-67, a new program was implemented in the Physical Education Department at Central Washington State College. A videotape recorder-camera chain was placed in Nicholson Pavilion to serve as an analyzing and instruction tool.

Instructors are using the videotape recorder in many different ways. The head football coach uses the recorder to expedite teaching rudiments of team play; the golf instructor uses the recorder to show a student his full golf swing; and the swimming coach uses the recorder to help his swimmers see their swimming form.

The purposes of this study are (1) to determine if beginning golf students who view a videotape replay of themselves performing a full swinging golf shot with an instructor's critique will score significantly higher on a specially designed skill instrument than beginning golf students whose performance is videotaped, but who are not exposed to a videotape replay, but are provided with an instructor's critique; (2) to determine if the use of a videotape replay with an instructor's critique causes a favorable attitude toward the use of a videotape replay.

II. LIMITATION OF THE STUDY

This study was limited to forty-five Central Washington State College students who were enrolled in two sections of Physical Education 62, both taught by Dr. Robert N. Irving during Winter Quarter, 1967-68.

The data regarding the students' golf performance skills was compiled by using "A Test for the Full Swinging Shot in Golf," by Mary Ellen McKee, Washington State University, 1949 (10:41). According to McKee, the elements which determine the results of a full swinging shot in golf are: (1) the velocity of the ball, (2) the angle of impact of the club head with the ball, and (3) angle of deviation to the left or right of the intended line of flight. For the purpose of this study, velocity of the ball was not computed.

III. DEFINITIONS OF TERMS USED

The following list of definitions is provided to acquaint the reader with unfamiliar terms which appear in the context of this study.

Mirror Television

This is a term used at Central Washington State College to define a situation where a television camera and videotape recorder is used to allow a performer to see himself as others see him.

Videotape Recorder-Camera Chain

The videotape recorder-camera chain used in this study consisted of (1) a Sony model DXC 2000 television camera with zoom lens, (2) a Sony EV 200 videotape recorder, (3) a Motorola video monitor with a 21-inch screen, and (4) a Shure microphone.

IV. ORGANIZATION OF THE REMAINDER OF THE THESIS

In Chapter II, a review of the related literature will acquaint the reader with the first uses of instructional television in education, the uses of instructional television in physical education, and the uses of videotape recorders in physical education.

In Chapter III, the reader will find a detailed discussion of the procedures used in this study.

A report of the findings of the study will be given in Chapter IV with an analysis of the data presented in table form.

A summary of the study, conclusions, discussion of its implications, and suggestions for additional research will be provided in Chapter V.

CHAPTER II

REVIEW OF THE LITERATURE

Videotape recording is a relatively new area in instructional television. Low cost and portable recorder-camera units are making their application in education more practical. However, few attempts have been made to use videotape recorders to teach motor skills in the education of America's youth.

Instructional television as it applies to general education and physical education are reviewed in this chapter, followed by a review of the literature on videotape recorders currently used in physical education to teach motor skills.

I. INSTRUCTIONAL TELEVISION

Instructional television has been used in our schools for about eighteen years. Educational historians of the future will probably note that this period represented about two decades of intensive research on the development and use of television as instructional media. These historians may also note that this research was stimulated largely by a predicted and actual shortage of competent teachers and by the need to educate a rapidly growing population which had to learn more than ever before because of the explosion of human knowledge during this period.

The great volume of research on instructional television has been made possible largely by considerable financial support, first from several of the philanthropic foundations in the mid-1950's, and more recently by the Federal government through such agencies as the Office of Education (14:1). Alongside well-financed programs of research and well-supported projects, there has been a steady stream of dissertation research conducted by individual researchers.

In the decade from 1951 to 1961, the Ford Foundation spent \$50 million on instructional television activities (2:196). These included:

(1) supporting the Joint Committee on Educational Television, the agency through which educators lobbied for the reservation of ETV channels and which later assisted local groups in activating those channels; (2) establishing and maintaining a center for ETV program production and distribution, which is now--after several name changes--called National Educational Television (NET); and (3) assisting in the construction of thirty-five ETV stations in key cities by granting \$3.5 million on a matching basis to educational institutions or community groups.

In the 1960's, the Federal Government gave financial support to instructional television:

In 1962 after several earlier attempts to get legislation past the House of Representatives, Congress passed the Educational Television Facilities Act and [and] authorized expenditures of \$32 million over a five year period (2:196).

By far the largest category of research was that of "relative effectiveness" studies, in which the performance of students instructed via television has been compared with the performance of others instructed directly, or face-to-face, by a teacher in the usual way.

In a study conducted in 1963, Stickell carefully examined some 250 comparisons between televised instruction and direct instruction. These were classified according to the extent to which they met his rather rigorous requirements for adequate experimental designs. Of the 250 comparisons, 217 were classified as "uninterpretable," 23 were classified as only "partially interpretable" because of various defects in experimental design, and a mere 10 studies were classified as "interpretable." Of these 10, all showed "no significant differences" in learning at the .05 level between television and direct instruction (14:4).

Although a finding of no significant difference does not prove that no differences exist, there was a practical value in such results. Consistent findings of no significant differences in learning from different instructional methods give educational administrators some confidence that several alternative methods of instruction were available for use. Administrators were allowed to choose which one should be used in a specific situation on the basis of considerations other than relative instructional merits. For example:

Television has excellent distributive powers. It can extend instruction (good or bad) to many places simultaneously. It is, therefore, an excellent means of extending experienced teachers and above-average teaching resources to larger numbers of students than would be possible under direct instruction. In this way television can offset a shortage of experienced teachers. To the extent that the television teacher is more experienced than the available

classroom teachers and has better instructional resources than might be available to the average classroom teacher, it is possible that televised instruction can be superior to direct teaching.

Another reason for using television might be to offer courses that would otherwise be unavailable. In some cases there might also be economic advantages in using televised instruction.

It is for these reasons that the use of instructional television has expanded so rapidly during the past 10 years (14:5).

By 1963, well over half of the major universities in the United States were using television for instructional purposes of one kind or another (5:172).

II. INSTRUCTIONAL TELEVISION IN PHYSICAL EDUCATION

The population explosion and shortage of competent teachers which stimulated the growth of instructional television in education was also the reason for its introduction into physical education.

Dr. Chalmer G. Hixson, in his article "The Status and Potential of Instructional Television for Physical Education," June, 1962, said,

Like other curricular areas, we face the prospect of more material to be taught, to greater numbers of students, by too few teachers, in too little space, with too few facilities. But adapting our teaching to television may be part of the answer to other vexing problems (7:25).

In July of 1964, the Physical Education Advisory Committee authorized the formation of a Division Committee on the Utilization of Educational Television in Physical Education. The committee was charged with the responsibility to:

. . . collect and disseminate information concerning the development of educational television in physical education and to establish and maintain liaison with other concerned organizations, e.d., National Education Association and National Association of Educational Broadcasters, and to encourage physical educators to increase the utilization and study of educational television as an instructional tool (6:87).

Television was used by many schools and colleges as a medium of public relations:

A recent study among the departments of physical education in 200 colleges of the country found that 50 publicized physical education through the medium of television (7:27).

Using television for public relations was instructional in the broad sense, but it was not planned as an integral phase of a course of study offered for credit by an institution.

A limited number of schools and colleges were utilizing television as an instructional technique in their physical education classes:

In a recent national survey of educational television facilities and institutions known to be producing telecourses, 23 of 357 respondees indicated some experience with instructional television in physical education. While it was the consensus of the group that instructional television was an effective teaching device, only four of the twenty-three were conducting research concerning the production of physical education (7:46).

Instructional television has not been used in physical education departments in colleges and universities as M. M. Mackenzie points out:

Unfortunately television has been used little as a medium for teaching physical education in institutions of higher learning. As of 1956, only 77 of our 1800 colleges and universities have utilized television as an instructional medium for students (11:69).

The early uses of instructional television in the field of physical education were in the realm of sports. Mere presentation of sports contests was not justification in itself for developing an instructional television program. The primary use of instructional television was:

. . . to improve instruction and learning in physical education. Only after one can justify expenditures on the basis of improved teaching and student performance should the spectator aspect be considered (11:69-70).

Although sports contests were not justification alone for developing an instructional television program, a program of teaching sports skills can be justified as it was by the Athletic Department of Ohio State University. Starting a program called "Champions of Tomorrow," televised over WTVN in Columbus, Ohio, they offered diving, golf, and football. The programs consisted primarily of demonstrations and participation in sports skills (8:30).

One of the early uses of closed circuit television to improve instruction and learning in physical education took place at Michigan State University. The initial experiment began with the televising of the Foundations of Physical Education Course during fall quarter, 1961:

A total of 66 sections (2,130 students) received instruction by television. Four women on the faculty shared the responsibility of the television teaching, and eleven faculty personnel, four graduate assistants, and sixteen upperclass major students were assigned as classroom instructors. Every aspect of the first trial by television was evaluated. Generally the results have been found

favorable and encouraging and have stimulated further experimentation with the use of television (9:29-30).

Another experiment took place in Tucson (Arizona) Public Schools, District #7, in 1962. Again the experiment results were found to be favorable. The director of the experiment "found the experiment in instructional television by the physical education department to be stimulating and exciting" (15:31).

Instructional television has great potential for assisting in the solution of some physical education problems. Chalmer G. Hixson, professor of physical education, Ohio State University, said:

It is no longer a question of "Should we make use of instructional television in our programs of health, physical education and recreation?" The question is "How can we best present our areas of education through the medium of television?" (7:25).

III. VIDEOTAPE RECORDERS IN PHYSICAL EDUCATION

A review of the literature reveals that videotape recorders have been used only to a limited extent by physical education educators in public schools and colleges.

One of the first uses of a videotape recorder in physical education was suggested by M. M. MacKenzie, U. S. Air Force Academy (11:69). The ideas that were incorporated in MacKenzie's article were not based upon established practice in physical education. Instead,

they were the product of much thought by MacKenzie. At that time (1958) there was not any "established practice" that could have been used for a base. MacKenzie states in his article:

With the use of rapid electro-magnetic reproduction equipment, it will be possible to show the student a motion picture of his performance immediately after the performance. The instructor then can point out the errors as the learner observes. The immediacy of observing is important to learning (11:69).

MacKenzie's ideas, although not based on established practice in physical education, have developed and are being used in a limited extent by physical education departments in public schools and colleges.

In December, 1964, Cupertino High School, California, bought a 75 pound magnetic television tape recorder (17:44). The videotape recorder was used in the physical education department by the head football coach to expedite teaching team play. Other physical education instructors, including the girls' modern dance instructor and coaches of other sports, use it to formulate program material and for on-the-scene instructional uses (17:45).

Another early user of videotape recorders in physical education was Hall High School in West Hartford, Connecticut (3:36). Hall was the first high school in the Northeast and one of the first in the nation to use videotape equipment in football. Coach Robinson said, "With the availability of new, low-cost videotape recorders, more and more high school coaches can be expected to adopt the electronic marvel" (3:56).

At Nova High School, Ft. Lauderdale, Florida, a program of videotaping the basketball team was set up. It was found that videotape recorders have certain advantages over the use of film:

1. No processing is needed
2. There's no additional cost, as we rely largely on student crews.
3. Instant replay can be employed for immediate use at practice
4. Stop motion and slow motion are available
5. Tape is reusable
6. Sound may be recorded along with picture, enabling the coach to instruct with the "film" (18:36).

Nova High School also had a system where the individual playbacks can be seen in three resource centers, each of which has six study carrels equipped with an eight-inch television monitor and a headset. To arrange a viewing, he merely asks the librarian for a specific tape.

In an article written by Rudy Bretz, he states:

Immediate playback of video tape allows a physical education student or school athlete to criticize objectively his own form and style as the coach points out his mistakes (1:949).

This statement by Bretz is an example of a program of "Mirror Television" that was set up at Purdue University. James Miles, director of radio and television, Purdue University, said:

A number of institutions are now experimenting with what has been dubbed at Purdue mirror TV. This is the simple use of the television camera and the video recorder to allow a performer to see himself as others see him. At Purdue, it has been used

successfully for ministers, speech students, physical education majors, drama majors, and teachers in training (12:559).

The nature of motor learning was at best a complicated task involving among other things the art of imitation. Efficient motor learning also requires frequent analysis of error. It was believed by some that when the athlete can see his own performance he can better interpret the analysis of his teacher and can more readily correct and improve. Thus by seeing others perform and by observing his own performance, the learning of motor skills becomes more rapid (11:69).

IV. SUMMARY

Instructional television has been used in our schools for about two decades and during this time there has been intensive research covering its development and use as instructional media.

Most of the studies concerned with teaching by instructional television as compared to direct instruction have found that there is "no significant differences" between the two, but instructional television has specific advantages over direct teaching, such as: greater distributive powers, offering courses that wouldn't be available otherwise, and it can be more economical.

Instructional television was introduced into physical education to help solve the problems of teacher shortages and over population.

Television was used in the field of sports, and many uses were soon found for it in the physical education classrooms. One of the early uses of instructional television was at Michigan State University where it was used to instruct 2,130 students in a Foundations of Physical Education course.

Videotape recorders have been used only to a limited extent by physical education educators. One of the first uses of a videotape recorder in physical education was suggested by the Director of the Audio-visual Department, U. S. Air Force Academy (1958). The director believed that the videotape recorder would give students the immediacy of seeing their own performance, which was very important to learning.

Videotape recorders followed the same course in physical education as did instructional television. It was first used by the sports departments of high schools and colleges to help coaches teach team sports, but as its uses become more familiar to physical education educators, additional uses of the videotape recorders in teaching motor skills are being discovered.

CHAPTER III

DESIGN OF THE STUDY

This is an experimental study to measure the value of videotape recorders as an effective instrument in providing video recall for analyzing and improving golf performance skills of beginning golf students.

I. HYPOTHESES

It was hypothesized in this study that beginning golf students who viewed a videotaped replay of themselves performing a full swinging golf shot with an instructor's critique will score significantly higher on a specially designed skill instrument than beginning golf students whose performance was videotaped, but who are not exposed to a videotaped replay, but are provided an instructor's critique.

It was further hypothesized that beginning golf students who are exposed to a videotape replay with an instructor's critique will have a favorable attitude toward the use of a videotape recorder.

II. DESCRIPTION OF THE SAMPLE

The subjects selected to participate in this study were randomly selected during Winter Quarter by the registration process at Central Washington State College. The subjects were registered for a beginning

golf class (Physical Education 62). The students had a choice of seven different periods, ranging from second period through sixth period. The third and fifth period classes were selected because Dr. Robert N. Irving was the instructor for both classes.

There were 53 students enrolled in the two classes during Winter Quarter, 1967-68. Not all of the students enrolled in the two sections were used in the study. As a result of students being added and dropped after a pretest was administered, it was necessary to adjust the total population to $N=45$, with 21 students in the experimental group and 24 students in the control group.

The variables, age, sex, and golf skill, of the two beginning golf classes were assumed to be distributed randomly between the control and experimental groups during registration.

III. EXPERIMENTAL DESIGN

The students were divided into two groups, an experimental group and a control group. A pre-test was given to both experimental and control groups before treatment and a post-test after treatment.

	Experimental Group	Control Group
Pre-Test	21 subjects	24 subjects
Post-Test	21 subjects	24 subjects

FIGURE 1
EXPERIMENTAL DESIGN

IV. INSTRUMENTATION

Two instruments were used in this experiment: (1) A Test for the Full Swinging Shot in Golf, and (2) an Attitude Scale.

'A Test for the Full Swinging Shot in Golf'

Borrowing heavily from an instrument developed by Miss Mary Ellen McKee (10:40), a test was devised to measure beginning golf students' performance skills.

Miss McKee developed two different tests: the hard ball test for outside testing and the cotton ball test for inside testing. For the purpose of this study, the cotton ball test was used because it was necessary to hold the golf classes indoors.

The elements in the skill of executing a full shot were: (1) Velocity imparted to the ball by the impact of the clubhead. The arc of the ball's flight could be computed using velocity and angle of impact, but, for the purposes of this study, velocity was not computed. (2) The angle of impact would determine the angle the ball leaves the ground. The number 5 iron used in this study was designed so the ball should leave the ground at an angle of 30° (13:28). This angle would vary with different irons according to the loft of the club head. (3) The deviation of the ball to the right or left of the intended line of flight which can be determined by using trigonometric functions. When the deviation was

figured, it gave the distance the ball actually traveled, which would be the range of the ball.

Validation of the Cotton Ball Test

Validity coefficients comparing softball and hardball tests as reported in Miss Mary E. McKee's study were as follows (10:43):

Validity of the Cotton Ball Test						
Number of Subjects	Club	Number of Trials	Range	Velocity	Angle of Impact	Angle of Deviation
55	5 iron	10	.73	.53	.61	.49
55	5 iron	10	.80	.66	.72	.62

A validity correlation of .3 and higher indicates that there was a relationship between the skill displayed in the two tests. The validity of the range was sufficiently high to warrant the consideration of the cotton ball test as a measure of skill in the full-swing shot in golf. The validity coefficient of velocity, angle of impact, and angle of deviation reflect positive relationships, but the diagnostic value of the test was somewhat impaired, although their validity was high enough to be acceptable when averaging the results of several trials.

Attitude Scale

To determine the attitude the students had toward their video-taping experience, an "attitude scale" was constructed. This instrument

asked nine objective questions directed at discovering the feelings the students had toward the videotaping experiences with an instructor's critique. This instrument was administered to the experimental group after their videotaping experience. No attempt was made to validate this instrument. (Appendix E.)

V. TREATMENT

The students were not advised that they were involved in a master's thesis study. The study was introduced as a project undertaken by the Audiovisual Library--Television Department.

Scheduling of the students that were to be videotaped during class was done by the instructor. The scheduling of the pre- and post-skill test and attitude scale was done by the instructor working with the writer.

A pre-test was administered during the first and second week of the quarter before any formal training in golf skills was started. Before administering the pre-test, an instruction sheet was handed out to both classes, giving the students instructions as to how the test would be administered and what was expected of them. (Appendix A.)

Both classes were tested taking three class periods for the control group and two class periods for the experimental group. The difference in time was due to the control group being larger. The post-test

was administered during the last week of the quarter with both classes taking the same amount of time to administer as in the pre-test.

Administering Pre- and Post-Skill Test

The equipment and lay-out of the pre- and post-test were given by Miss McKee in her study and are as follows:

1. Area 20 x 100 yards.
2. Three tape measures. One tape is attached to the floor or ground at the point from which the ball is to be hit in such a manner that the tape may be moved back and forth to measure the range directly. The other two tapes are placed at a point 40 feet from the point of impact with the zero end of each tape placed upon the line designating the desired line of flight. These tapes are then stretched at right angles to the desired line of flight and are used to measure the deviation to the right or left.
3. One fast stop watch.
4. One dozen plastic balls.
5. One number five iron.
6. Three administrators, one to measure the range, one to measure the deviation, and one timer and recorder (10:50).

Because the number of students to be tested (45) was large, it was necessary to set up two testing areas.

The pre- and post-test was administered according to procedures given in Miss McKee's study, but with minor changes. The procedures were as follows:

1. Each student received 10 trials.

2. The ball had to be in the air for at least .4 of a second to be counted a trial.
3. At the end of each student's 10 trials the tape measure attached to the floor at the point of impact was moved to the place that the ball first touched the floor, measuring the range the ball traveled.
4. Deviation to the right or left was determined at the point that the tape measuring the range intersected the tape measuring the deviation.
5. The time that the ball was in the air between the moment of impact and first touching the floor was determined by a stop watch (10:49).

Treatment by Instructor of Experimental Group

The instructor had been using a videotape recorder in his classes since Fall Quarter, 1966, in the same manner employed in this study. A group of four or five students selected by the instructor moved to a corner of the field house where the videotape equipment was stationed, with the rest of the class assigned to practice in the remaining area. The instructor marked out an area drawing two lines on the floor at right angles. The student was instructed that he would be televised from two directions and that he was to hit three balls with the television camera recording a front view of his swing first and then he was to change positions to where his side was toward the television camera, again hitting three balls.

While the student was performing, the instructor recorded his verbal comments concerning the student's performance into the videotape

recorder. After videotaping four or five students, the instructor would gather them around the television monitor and each student would view his video replay hearing the instructor's comments. Then their video replay was viewed again with live verbal critique by the instructor and using slow motion, stop, and rewind actions to point out particular points.

During the quarter each student in the experimental group was videotaped two times following the steps outlined for the experimental group.

Treatment by Instructor of Control Group

The instructor used the same instructional procedures for both the control and the experimental groups. However, members of the control group were not allowed to see their replay. Students in the control group did not view a video replay of their performance, but had to recall a mental image of their performance as the instructor held a critique.

VI. CONTROLS

Several variables had to be controlled to insure that only the videotape replay with an instructor's critique would be different between the control and experimental groups.

Instructor Bias

The classroom instructor was not involved in the administration of either the pre- or post-skill test. Both classes were instructed by the same instructor employing identical teaching techniques with the only difference being that the control group did not receive video replays with an instructor's critique.

Golf Skills

The variable of golf skill was controlled by administering the same pre-test to both the experimental and control groups. Both groups were tested using the same skill test; therefore, the results of the test would indicate any difference in the student's golf skills.

Administering Skill Test

All scores were results of direct measurements and each administrator received instruction in taking these measurements. The test areas were set up each time by the writer.

Hawthorne Effect

To avoid the possibility of the Hawthorne Effect, both groups were videotaped during the study, but only the experimental group was allowed to view their replays. The study was introduced as a project undertaken by the Audiovisual Library--Television Department and was part of the requirements of Physical Education 62.

VII. ANALYSIS OF THE DATA

A statistical test was used to test the first hypothesis of this study. This hypothesis was a directional hypothesis; therefore, a one-tailed t ratio was used to test for significances in the range and deviation. The angle of impact was reported descriptively using the differences between the means.

The second hypothesis dealt with an attitude scale given only to the experimental group. The responses on the instrument were recorded descriptively and Kolmogorov-Smirnov one-sample test was used to test for significances.

VIII. SUMMARY

This was an experimental study to measure the value of videotape recorders as an effective instrument in providing video recall for analyzing and improving golf performance skills of beginning golf students.

It was hypothesized in this study that beginning golf students who viewed a videotape replay of themselves performing a full swinging golf shot with an instructor's critique will score significantly higher on a specially designed skill instrument than beginning golf students whose performance was videotaped, but were not exposed to a videotape replay, but were provided with an instructor's critique. It was further hypothesized that the beginning golf students who were exposed to the videotape replay

with an instructor's critique will have a favorable attitude toward the use of a videotape recorder.

The subjects who participated in this study were taken from two sections of Physical Education 62 taught by Dr. Robert N. Irving during Winter Quarter 1967-68. There were 45 subjects used in the study with 21 in the experimental group and 24 in the control group.

Two instruments were used in the study: (1) "A Test for the Full Swinging Shot in Golf," and (2) an attitude scale.

The test, "A Test for the Full Swinging Shot in Golf," was developed by Miss Mary E. McKee, Washington State University, 1949. A pre-test measuring golf skills was administered during the first and second week of the quarter before any formal training in golf skills was started. The post-test measuring golf skill improvement was administered during the last week of the quarter. An attitude scale was given to the experimental group and was designed to discover the feelings the students had toward the videotaping experience with an instructor's critique.

Several variables were controlled to insure that only the videotape replay with an instructor's critique would be different between the control and experimental group: (1) Instructor Bias, (2) Golf Skills, (3) Administering Skill Test, and (4) Hawthorne Effect.

CHAPTER IV

ANALYSIS OF RESULTS

Findings of the study are reported in this chapter. The results of beginning golf students viewing videotape replays of their golf performance with an instructor's critique as measured by a pre- and post-skill test and the students' attitude toward the use of videotape replays with an instructor's critique will be reported.

I. FINDINGS OF THE STUDY

The first statistical hypothesis in this study was: That beginning golf students who view a videotape replay of themselves performing a full swinging golf shot with an instructor's critique will score significantly higher on a specially designed skill instrument than beginning golf students whose performance is videotaped but who are not exposed to a videotape replay but are provided an instructor's critique.

The null hypothesis of no differences was tested. The pre- and post-skill test was designed to provide evidence for this hypothesis. The test was divided into three areas: (1) range of the ball, (2) deviation of the ball, and (3) angle of impact of the ball.

Range

The F-ratios for the pre- and post-test of both the control and experimental groups were found to determine that the population of both groups had the same variance. The pre-test of the experimental group had a variance of 309.18 as compared to 177.87 for the control group. A F-ratio of 1.74 was computed for the pre-test. In the post-test, the experimental group variance was 202.54 and the control group variance 237.74 with a value of 2.78 needed for significance at the .02 level of significance. The post-test F-ratio was 1.17. The F-ratio for both the pre- and post-test were not significant and the assumption of homogeneity of variance requirement for the t ratio was satisfied (See Table I).

TABLE I

COMPARISON OF THE VARIANCE AND F-RATIO OF EXPERIMENTAL AND CONTROL GROUPS IN THE RANGE SECTION OF THE PRE- AND POST-TEST

	Variance		F-Ratio
	Experimental	Control	
Pre-Test	309.18	177.87	1.74*
Post-Test	202.54	237.64	1.17*

A value of 2.78 needed for significance at .02 level

* Not significant

The mean and standard deviation of the range in the experimental and control groups were found for both the pre- and post-test. The control group pre-test mean was 56.9 with a standard deviation of 13.33, while the experimental group had a mean of 56.8 and a standard deviation of 17.58. The experimental group mean score was .1 point lower than the control group and the standard deviation was 4.35 greater. The means of the experimental and control groups on the pre-test were only .1 point apart with a t ratio of .021, indicating no significant difference at .02 level of significance.

The post-test mean of the experimental group was 70.7 and standard deviation 14.23, while the control group had a mean of 56.4 and a standard deviation of 15.41. The experimental group mean was 14.3 points higher than the control group and the standard deviation was 1.18 points less. A t ratio of 3.22 at 43 degrees of freedom on the post-test indicated significant difference in favor of the experimental group. The difference was significant at the .02 level. A value of 2.016 was required for a significant difference at the .10 level of significance and a value of 2.698 was required for significant difference at the .02 level (4:501).

The results of mean score, standard deviation, and t ratio of the pre- and post-test range are summarized in Table II.

TABLE II

COMPARISON OF THE MEAN, STANDARD DEVIATION, AND T RATIO
OF EXPERIMENTAL AND CONTROL GROUPS IN THE
RANGE SECTION OF PRE- AND POST-TEST

	Mean Score#		Standard Deviation		t Ratio
	Exp.	Cont.	Exp.	Cont.	
Pre-Test	56.8	56.9	17.58	13.33	.021
Post-Test	70.7	56.4	14.23	15.41	3.22*

A value of 2.698 needed for significance at .02 level.

Measurements in feet.

* Significant at .02 level of confidence

Deviation

The population of the experimental and control groups had the same variance with the F-ratio of both the pre- and post-test found. The variances for the post-test were 19.91 for the experimental group and 9.88 for the control group. This gave an F-ratio of 2.01 for the post-test, which was not significant. The variances for the pre-test were 112.09 for the experimental group and 50.63 for the control group. A value of 2.78 was needed for significance at the .02 level of confidence. The pre-test F-ratio was 2.21. (See Table III.)

Small differences existed between the means of the experimental and control group in their deviation on the pre-test. The experimental group mean score of 12.3 was only 1.4 points lower than the control

TABLE III

COMPARISON OF THE VARIANCE AND F-RATIO OF EXPERIMENTAL
AND CONTROL GROUPS IN THE DEVIATION SECTION
OF THE PRE- AND POST-TEST

	Variance		F-Ratio
	Experimental	Control	
Pre-Test	19.91	9.88	2.01*
Post-Test	112.09	50.63	2.21*

A value of 2.78 needed for significance at .02 level.

* Not significant.

group mean of 13.7. Large differences existed between the means of the experimental and control groups in the post-test. The experimental group with a mean of 8.6 points was 2.7 points below the control group with a mean of 11.3 points. In the pre-test of the experimental group, the standard deviation of 10.58 was 3.47 points higher than the control group standard deviation of 7.11. The post-test of the control group had a standard deviation of 3.11 points, which was 1.30 points lower than the experimental group standard deviation of 4.41.

A \underline{t} ratio of 2.38 in the post-test was significant at the .10 level of confidence with the pre-test having no significance with a \underline{t} ratio of .53. The results of the mean score, standard deviation, and \underline{t} ratio of the pre- and post-test deviation are summarized in Table IV.

TABLE IV

COMPARISON OF THE MEAN, STANDARD DEVIATION, AND T-RATIO
OF EXPERIMENTAL AND CONTROL GROUPS IN DEVIATION
SECTION OF PRE- AND POST-TEST

	Mean Score#		Standard Deviation		t Ratio
	Exp.	Cont.	Exp.	Cont.	
Pre-Test	13.3	13.7	10.58	7.11	.53
Post-Test	8.6	11.3	4.41	3.11	2.38*

A value of 2.016 needed for significance at .10 level.

* Significant at the .10 level of significance.

Measurement in feet.

Angle of Impact

To determine if there were any differences in the angle the ball was imparted by the club head between the experimental and control groups, the means of both groups were computed. The control group had a mean of 35.6° in the pre-test as compared to 34.6° for the experimental group. Separated by 1° in the pre-test, the two groups were closely related, but in the post-test the experimental group's angle of impact increased to 37.9° while the control group reduced their score to 31.5° , a difference of 6.4° . No test of significance was found that could be used to measure the relationship between the expected angle of impact (30°) and the measured angle of impact. Therefore, only the means of the experimental and control groups were reported. A summary of the means for the angle of impact are listed in Table V.

TABLE V

COMPARISON OF THE MEANS OF THE EXPERIMENTAL AND CONTROL GROUPS ON THE ANGLE OF IMPACT SECTION OF THE PRE- AND POST-TEST

	Mean Score		Angle Expected*
	Experimental	Control	
Pre-Test	34.6°	35.6°	30°
Post-Test	37.9°	31.5°	30°

* Manufacturer's built-in angle of loft for #5 iron.

Attitude Scale

The second statistical hypothesis tested was: Beginning golf students who are exposed to a videotape replay with an instructor's critique will have a favorable attitude toward the use of a videotape recorder. The null hypothesis of no differences was tested.

To determine the student's attitude toward the use of videotape replays with an instructor's critique, an attitude scale was given to the experimental group during the last week of the quarter. Administration of the instrument was just prior to the post-skill test. The results of the attitude scale are stated descriptively and Kolmogorov-Smirnov one-sample test was used to test for significance.

1. The opportunity to observe and listen to a videotape was helpful to me in improving my golf skills.

27%	a. Agree very strongly	6
55%	b. Agree strongly	12
18%	c. Agree	4
0%	d. Disagree very strongly	0
0%	e. Disagree strongly	0
0%	f. Disagree	0

2. The critique, provided by the instructor, accompanying the videotape replays, was valuable in improving my golf skills.

18%	a. Agree very strongly	4
64%	b. Agree strongly	14
14%	c. Agree	3
0%	d. Disagree very strongly	0
0%	e. Disagree strongly	0
4%	f. Disagree	1

3. The experience of being televised and having my replays analyzed was an enjoyable experience.

27%	a. Agree very strongly	6
27%	b. Agree strongly	6
32%	c. Agree	7
0%	d. Disagree very strongly	0
0%	e. Disagree strongly	0
14%	f. Disagree	3

4. The opportunity to see my golf swing errors was made more meaningful using videotape replays, with instructor critique, than just being told about my golf swing errors.

68%	a. Agree very strongly	15
23%	b. Agree strongly	5
9%	c. Agree	2
0%	d. Disagree very strongly	0
0%	e. Disagree strongly	0
0%	f. Disagree	0

5. The experience of watching my fellow students' replays, with instructor critique, has helped me improve my golf skills.

14%	a. Agree very strongly	3
32%	b. Agree strongly	7
45%	c. Agree	10
0%	d. Disagree very strongly	0
0%	e. Disagree strongly	0
9%	f. Disagree	2

6. I recommend the videotape experience of seeing oneself be provided with instructor critique.

54%	a. Agree very strongly	12
32%	b. Agree strongly	7
9%	c. Agree	2
0%	d. Disagree very strongly	0
0%	e. Disagree strongly	0
4%	f. Disagree	1

7. I recommend the videotape experience of seeing oneself be provided without instructor critique.

4%	a. Agree very strongly	1
0%	b. Agree strongly	0
9%	c. Agree	2
45%	d. Disagree very strongly	10
9%	e. Disagree strongly	2
33%	f. Disagree	7

8. I recommend that students have the opportunity of seeing a fellow student's video replay with instructor critique.

41%	a. Agree very strongly	4
23%	b. Agree strongly	2
27%	c. Agree	14
0%	d. Disagree very strongly	0
0%	e. Disagree strongly	0
9%	f. Disagree	2

9. I recommend to my friends the experience of seeing oneself on videotape replay, with instructor critique.

41%	a. Agree very strongly	9
23%	b. Agree strongly	5
27%	c. Agree	6
0%	d. Disagree very strongly	0
0%	e. Disagree strongly	0
9%	f. Disagree	2

Using Kolmogorov-Smirnov one-sample test, the maximum deviation (D) of the observed distribution of scores was compared with a theoretical distribution for the attitude scale (16:47). The results of the test caused the null hypothesis to be rejected and the statistical hypothesis that there would be differences was accepted. The D-value for the attitude scale was .474 and a value of .34 was needed for significances at the .01 level.

To determine which statements on the attitude scale were responsible for the significant difference, a Kolmogorov-Smirnov one-sample test was made on each question. All of the statements of the attitude scale had a D-value above the .01 level of significance. The D-value of the attitude scale and the D-value of each statement are given in Table VI.

TABLE VI

D-VALUES OF THE ATTITUDE SCALE AND STATEMENTS

Attitude Scale Statements	D-Value
Total	.474*
1	.500*
2	.484*
3	.363*
4	.575*
5	.409*
6	.454*
7	.363*
8	.409*
9	.409*

A value of .34 needed for significance at .01 level.

* Significant at the .01 level of confidence.

II. SUMMARY

The two hypotheses tested in this study were:

- Ho₁: No difference exists between the golf skills of beginning golf students who view a videotape replay of themselves performing a full swinging golf shot with an instructor's critique than beginning golf students whose performance is videotaped but who are not exposed to a videotape replay, but are provided with an instructor's critique.
- Ho₂: No difference exists in the expected number of choices for each of the six ranks in the attitude scale by students who are exposed to a videotape replay with an instructor's critique and any observed differences in attitude are merely chance variations.

The null hypothesis that there would be no significant difference between the scores of the experimental and control groups on a specially designed skill test was rejected and the statistical hypothesis that there would be significant difference was accepted for hypothesis 1. The group of students who were videotaped and viewed their replays with an instructor's critique (experimental group) scored significantly higher on the skill test in all areas except the angle of impact than did the group of students who were videotaped (control group) but were not exposed to a videotape replay with an instructor's critique. The \underline{t} ratios of the pre- and post-test are summarized in Table VII.

TABLE VII
SUMMARY OF \underline{T} RATIOS IN PRE- AND POST-TEST

	Range \underline{t} ratio	Deviation \underline{t} ratio
Pre-Test	.021	.53
Post-Test	3.22*	2.38**

A value of 2.016 needed for .10 level of significance, and a value of 2.698 needed for .02 level of significance.

* Significant at the .02 level of significance.

** Significant at the .10 level of significance.

The control group came closer to the manufacturer's suggested angle of impact for a number 5 iron (30°) than the experimental group.

A summary of the means of the angle of impact are given in Table VIII.

TABLE VIII
SUMMARY OF PRE- AND POST-TEST MEAN SCORES
FOR THE ANGLE OF IMPACT

	Mean Score		Expected Angle*
	Experimental	Control	
Pre-Test	34.6°	35.6°	30°
Post-Test	37.9°	31.5°	30°

* Manufacturer's built-in angle of loft for #5 iron.

The null hypothesis that there was no difference in the expected number of choices for each of the six ranks in the attitude of students who were exposed to a videotape replay with an instructor's critique was rejected and the statistical hypothesis that there would be differences was accepted. The D-value of the attitude scale was significant at the .01 level of significance.

CHAPTER V

SUMMARY AND CONCLUSIONS

I. SUMMARY

This was an experimental study to: (1) determine if beginning golf students who viewed a videotape replay of themselves performing a full swinging golf shot with an instructor's critique would score significantly higher on a specially designed skill instrument than beginning golf students whose performance was videotaped but who were not exposed to a videotape replay but provided with an instructor's critique only; (2) determine if beginning golf students who were exposed to a videotape replay with an instructor's critique would have a favorable attitude toward the use of a videotape recorder.

The review of literature in Chapter II indicated that instructional television has been used in our schools for about two decades and that during this time there has been intensive research covering its development and use as an instructional media.

A majority of the studies have found "no significant differences" between the use of instructional television as compared to direct instruction, but instructional television has specific advantages over direct teaching, such as: greater distribution powers, offering courses that wouldn't be available otherwise, and it can be more economical.

Instructional television was introduced into physical education to help solve the problem of teacher shortages and over population. Television was used in the field of sports, and soon found many uses in physical education. Michigan State University was one of the first to use instructional television in instructing large physical education courses.

Videotape recorders have been used only to a limited extent by physical educators. In 1958, the Director of the Audiovisual Department, U. S. Air Force Academy, suggested the first uses of the videotape recorder in physical education. Cost had kept the videotape recorder out of reach of most physical education departments in the past, but as the cost has been reduced, their application has increased.

During Fall Quarter, 1966-67, a new program was implemented in the Physical Education Department at Central Washington State College. A videotape recorder-camera chain was placed in Nicholson Pavilion to serve as an instructional tool. Instructors are using the videotape recorder in teaching team play, golf, and swimming classes.

Careful planning and much deliberation must precede any new program. Once a program is implemented, research must be enacted to determine if the objectives are being fulfilled.

To measure the value of the videotape recorder as an effective instrument in providing video recall for analyzing and improving golf

performance skills of beginning golf students, forty-five students who were enrolled in two Physical Education 62 courses during Winter Quarter 1967-68 were randomly selected by the registration process with the third period class being the control group and the fifth period class serving as the experimental group.

Two instruments were designed for this study: (1) "A Test for the Full Swinging Shot in Golf," developed by Miss Mary E. McKee, Washington State University, 1949, and (2) an attitude scale to determine the students' reactions to the use of a videotape replay with an instructor's critique.

The pre-test was administered during the first and second weeks of the quarter before any formal training in golf skills was started, and the post-test was given during the last week of the quarter. The tests were administered according to procedures given in Miss McKee's test with modification for the purpose of this study. The instructor treated both classes identically except the control group was not exposed to their videotape replays. With the instructor making verbal comments into the videotape recorder concerning a student's golf swing, each student in the experimental group was televised and allowed to view his replay with an instructor's critique.

To determine the attitude the student had toward the videotaping experience, an attitude scale was given. This instrument was

administered to the experimental group after their videotaping experience.

Several variables had to be controlled to insure that only the videotape replay with an instructor's critique would be different between the control and experimental groups. (1) Instructor bias was controlled by the instructor not administering the pre- and post-tests and both groups being taught by the same instructor. (2) The variable of golf skill was controlled by administering the same pre-test to both the experimental and the control groups. (3) The administration of the skill test was controlled because all measurements were direct and each administrator was instructed in taking measurements. (4) To avoid the possibility of the Hawthorne effect, both groups were videotaped during the study with only the experimental group allowed to see their replays.

A one-tailed t test was implemented to test for significant differences between the mean scores of the range and deviation of the experimental and control groups. Means of both control and experimental groups only were used for reporting results of the angle of impact. The t ratios and means are summarized in Table IX.

The results of the attitude scale were favorable toward treatment and were stated descriptively and Kolmogorov-Smirnov one-sample test was used to test for significance. The D-value of the attitude scale was significant at the .01 level of significance.

TABLE IX
SUMMARY OF T-RATIOS AND MEANS

	Range t ratio	Deviation t ratio	Angle of Impact Exp.	Mean Cont.
Pre-Test	.021	.53	34.6°	35.6°
Post-Test	3.22*	2.38**	37.9°	31.5°

* Significant at the .02 level of significance.

** Significant at the .10 level of significance.

II. CONCLUSIONS

From the results indicated in Chapter IV, the following conclusions can be made:

1. Viewing a videotape replay while practicing a full swinging golf shot with an instructor's critique does cause beginning golf students to score significantly higher on a specially designed skill test than if provided with an instructor's critique only.
2. Beginning golf students have a favorable attitude toward the use of videotape replays with an instructor's critique, and the students felt that the experience was worthwhile and helpful.

III. IMPLICATIONS FOR FUTURE RESEARCH

This study was conducted to measure the value of using a videotape recorder as an analyzing and instructional tool in teaching golf performance skills. Results of the study indicated that it was of value as an analyzing and instructional tool.

Since this study indicated that there were significant differences, institutions throughout the country with physical education programs should examine the potential of the videotape recorder and consider incorporating this tool in their physical education programs. Before this is done, the results of this study should be replicated through a similar study. If a replica of this study were attempted, there are a few problems that should be considered.

Knowledge of how golf is played and the fundamentals of the full swing would be of great assistance to anyone attempting this study. For this reason, people involved in the field of physical education should consider replicating this study.

The instrument used in this study for the pre- and post-skill test was developed by Miss Mary E. McKee and is very technical. The computations that must be made from the measured data are long and involved; much preparation should be undertaken before using this test. It takes some knowledge of trigonometry before the raw scores can be computed. It is possible to develop tables that can be used for direct

conversion of raw data, and it is the recommendation of this writer that this task be accomplished if the study is replicated using the same skill test.

Elements that make up a full golf swing are (1) velocity imparted to the ball, (2) the angle of impact, and (3) the deviation of the ball. These are the bases of the test and should be understood by the person given the test. The velocity of the ball was not reported in this study because it was not understood how to report the relationship of the velocity to this study. In future studies, the velocity could be incorporated into the data if its implications to the study were understood.

These have been a few of the problems which this experiment has exposed. The use of videotape recorders is still very limited in the field of physical education, but educators are beginning to realize the possibilities which videotape recorders provide for improving physical education objectives. This experiment has been one of the many needed before videotape recorders are employed in physical education courses in colleges and universities on a wide basis.

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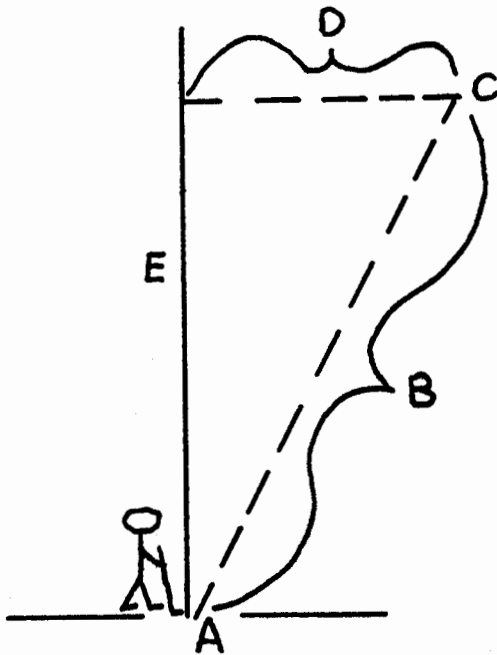
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APPENDIX A

PLASTIC BALL TEST INSTRUCTIONAL SHEET

PLASTIC-BALL TEST



- (A) starting area
- (B) range of ball
- (C) ball first touched
- (D) deviation
- (E) center line

I. STUDENT

1. There will be two test areas set up in the field house.
 - a. You will be assigned one of the two areas.
2. Using a number 5 iron you will be hitting 10 plastic balls in a row.
 - a. A timekeeper will measure the time your ball is in the air so be sure he is set before you hit your ball.
 - b. Your ball must be in the air for .4 seconds before it is considered a valid shot.
3. REMEMBER it is important to think about your shot.

II. INSTRUCTOR

1. A timekeeper will measure and record the flight time of the ball.
2. A marker will be spotted where the ball first lands.
3. At the end of each 10 trials there will be a measuring crew to measure and record scores.

APPENDIX B

PRE- AND POST-TEST SCORE SHEET

_____ Name _____

_____ Name _____

TRIAL	RANGE	DEVIATION	TRIAL	TIME
1			1	
2			2	
3			3	
4			4	
5			5	
6			6	
7			7	
8			8	
9			9	
10			10	

APPENDIX C

PRE- AND POST-TEST TOTAL SCORE SHEET

Student _____

	TIME	RANGE		DEVIATION	IMPACT	VELOCITY
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

APPENDIX D

EXAMPLE OF CALCULATIONS OF SCORES

PLASTIC BALL TEST

EXAMPLE OF CALCULATIONS OF SCORES

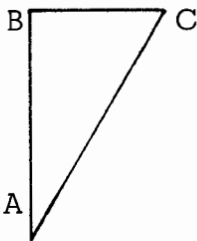
PLASTIC BALL TEST

1. Data:

Deviation	2 feet (measured 40 feet from point of impact)
Range	60 feet
Time of flight	2 seconds

2. Calculations:

- a. Angle of Deviation--The amount of deviation from the designated line of flight.



A. Point of impact

B. Point from which CB is measured

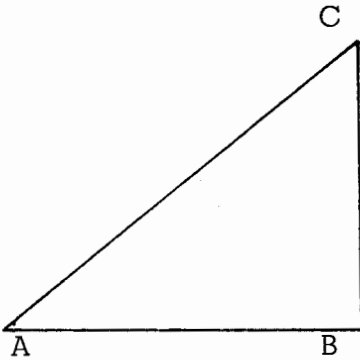
C. Point where tape measuring the range intersects the tape measuring deviation

Angle A Angle of deviation

$$\text{Tangent angle A} = \frac{BC}{AB} = \frac{2}{40} = .05$$

Angle A = 2 degrees and 52 minutes

- b. Angle of Impact--The angle in a perpendicular plane formed by the range and the direction of the acceleration imparted to the ball by the clubhead.



- A. Point of impact of ball and club
 B. Point the ball first struck the floor
 C. Height of ball neglecting gravity
 AB Distance gravity moved ball
 AC Distance the ball would have traveled in direction of club-head acceleration

Angle A Angle of impact

- Distance gravity moved the ball

$$S = \frac{1}{2} gt^2 = \frac{1}{2} \times (2 \text{ seconds})^2 = 64 \text{ feet}$$

- Tangent angle of impact = $\frac{CB}{AB} = \frac{64 \text{ feet}}{60 \text{ feet}} = 1.066$

Angle of impact is 46 degrees 50 minutes

APPENDIX E

ATTITUDE SCALE

STUDENT REACTIONS TO VIDEO TAPE REPLAYS

This instrument is an attempt to determine your attitude toward your experience with video tape replays, with instructor critique. This information will in no way affect your grade.

Please read the following statements about video tape replays and state your feelings about each statement by checking (✓) each statement below that expresses your sentiment.

1. The opportunity to observe and listen to a video tape replay was helpful to me in improving my golf skills.

<input type="checkbox"/> agree very strongly	<input type="checkbox"/> disagree very strongly
<input type="checkbox"/> agree strongly	<input type="checkbox"/> disagree strongly
<input type="checkbox"/> agree	<input type="checkbox"/> disagree

2. The critique, provided by the instructor, accompanying the video tape replays was valuable in improving my golf skills.

<input type="checkbox"/> agree very strongly	<input type="checkbox"/> disagree very strongly
<input type="checkbox"/> agree strongly	<input type="checkbox"/> disagree strongly
<input type="checkbox"/> agree	<input type="checkbox"/> disagree

3. The experience of being televised and having my replays analyzed was an enjoyable experience.

<input type="checkbox"/> agree very strongly	<input type="checkbox"/> disagree very strongly
<input type="checkbox"/> agree strongly	<input type="checkbox"/> disagree strongly
<input type="checkbox"/> agree	<input type="checkbox"/> disagree

4. The opportunity to see my golf swing errors was made more meaningful using video tape replays, with instructor critique, than just being told about my golf swing errors.

<input type="checkbox"/> agree very strongly	<input type="checkbox"/> disagree very strongly
<input type="checkbox"/> agree strongly	<input type="checkbox"/> disagree strongly
<input type="checkbox"/> agree	<input type="checkbox"/> disagree

5. The experience of watching my fellow student's replay, with instructor critique, has helped me improve my golf skills.

<input type="checkbox"/> agree very strongly	<input type="checkbox"/> disagree very strongly
<input type="checkbox"/> agree strongly	<input type="checkbox"/> disagree strongly
<input type="checkbox"/> agree	<input type="checkbox"/> disagree

6. I recommend the video tape experience of seeing one's self, be provided with instructor critique.

<input type="checkbox"/> agree very strongly	<input type="checkbox"/> disagree very strongly
<input type="checkbox"/> agree strongly	<input type="checkbox"/> disagree strongly
<input type="checkbox"/> agree	<input type="checkbox"/> disagree

7. I recommend the video tape experience of seeing one's self, be provided without instructor critique.

<input type="checkbox"/> agree very strongly	<input type="checkbox"/> disagree very strongly
<input type="checkbox"/> agree strongly	<input type="checkbox"/> disagree strongly
<input type="checkbox"/> agree	<input type="checkbox"/> disagree

8. I recommend that students have the opportunity of seeing a fellow student's video tape replay with instructor critique.

<input type="checkbox"/> agree very strongly	<input type="checkbox"/> disagree very strongly
<input type="checkbox"/> agree strongly	<input type="checkbox"/> disagree strongly
<input type="checkbox"/> agree	<input type="checkbox"/> disagree

9. I recommend to my friends the experience of seeing one's self on video tape replay, with instructor critique.

<input type="checkbox"/> agree very strongly	<input type="checkbox"/> disagree very strongly
<input type="checkbox"/> agree strongly	<input type="checkbox"/> disagree strongly
<input type="checkbox"/> agree	<input type="checkbox"/> disagree