

T H E V A L U E O F A C A S S E T T E T A P E
R E C O R D E R A S A T E C H N I Q U E F O R
T E A C H I N G H O M E M A K I N G A T T H E
J U N I O R H I G H S C H O O L L E V E L

A THESIS

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CHAPTER I

I N T R O D U C T I O N

Technological changes of the last 10 years have stimulated changes in the methods of teaching. Brown, Lewis and Harclerod (3) observed that changes in a society bring about changes in the institutions of the society, including education. In 1959 Sputnik focused public attention on the need for survival. Equated with the need for survival was the need for accelerated learning. Since that date, plans for improving school curriculum have been directed toward an increase of subject matter content.

Leeper (19) observed that the present society is constantly in the process of being enriched by the creation of new inventions. Advances in technology present innovations to the processes of teaching. According to Brown, Lewis and Harclerod (3), innovation should be emphasized in the search for improved instruction. Wigren (33) defined educational technology as not only hardware and software, but the more important overall process of using technology for the application of all resources for learning.

According to Bernstein (1), the cassette tape recorder was perfected about five years ago, but was not widely

available on the public market until about two years later. The cassette tape recorder offers rich opportunity for research in the area of homemaking education. The use of a cassette tape recorder is an innovation in the process of teaching homemaking. Fleck (10) pointed out that the use of listening aids presents another facet in the acquisition of knowledge. Leeper (19) stated that,

When a teacher or a supervisor or a principal gains insight and confidence to introduce a change that he believes to be for the enhancement of the teaching learning situation, this is innovation at the point of greatest need and significance.

STATEMENT OF THE PROBLEM

With the appearance of each new instructional device the teacher is confronted with new choices in the presentation of subject matter. Innovations require research to validate their effectiveness in terms of educational objectives. An examination of the effectiveness of the use of a cassette tape recorder in classroom teaching can provide guidance to the general effort of improving instruction.

The purpose of this study was to investigate the effectiveness of a cassette tape recorder as a technique for enriching the quality of homemaking education at the junior high school level. The cassette tape recorder was introduced as an experimental technique of teaching.

REVIEW OF LITERATURE

Innovations Stimulated by Technological Advances

In the area of communications, society has been in a constant state of action and reaction during the last 50 years (17). Technological advances have created a revolution in the area of giving and receiving information. Johnson (16) observed that

One of the most spectacular developments in our times has been the revolution in communications. . . . Historically, the transition has been from handwritten manuscripts to printing, photography and photo-engraving, to the publication and mass circulation of books, newspapers and magazines; from use of the human voice limited to personal confrontation to the telephone and recording disk and tape, to motion pictures and videotape, to radio, television, and telestars. These latter media, which penetrate man's consciousness almost every moment of his living and working days, are so changing his life and habits as to constitute a remolding process to which he is involuntarily subjected. Or, as Marshall McLuhan would have it, "The medium is the message."

The scientific and technological advancements of today are bringing about more teaching innovations than in any previous time in history.

Komoski (18) pointed out that the Greek definition of technology embraces far more than the use of mechanical devices. To the Greeks, technology embodied any procedure of human authorship, whether it be action or artifact, that was

systematically organized for easy employment by others. This definition of technology can be applied to the educational devices offered for classroom instruction. One problem in choosing consumer goods is to carefully discriminate between the options offered. Bruner (4) called attention to the fact that new inventions produce new forces and new problems. Bruner further emphasized that much more effort is required in the actual preparation of curriculum materials, in teacher training, and in supporting research if improvements in today's educational practices are to meet the challenges of the current scientific and social revolution. Ginther (11) maintained that, "Technology generates a reason for thinking harder about what one might like to provide for students."

Ofiesh (26) stated that "The immediate goal of education must be to communicate knowledge more efficiently and more effectively in order to increase learning." According to Brown, Lewis and Harclerod (3), emphasis on the innovative process in improving "schooling" is an important characteristic of today's educational research. An innovation can be an entirely new approach, or a new idea, or, it can be a line of action made possible through new technology. Purdy (27) emphasized that,

Innovation in education is the creative selection, organization, and utilization of human and material resources in new and unique ways which result in the attainment of a higher level of achievement of the defined goals and objectives.

History of the Cassette Tape Recorder

The month of July, 1966, marked the date that the name "cassette tape recorder" was publicly launched (1). McGraw-Hill's Merchandising Week (23) proclaimed this generic term for the marketing of a new compact, durable, easily operated recorder, which was previously called a "cartridge system." However, the very beginnings of the present day cassette tape recorder began in the early 1960's when a cartridge system for use in automobiles appeared on the West Coast. This system was an attempt to make a recorder as simple as an "instant" loading camera, but the product had serious drawbacks. The cartridge recorder was bulky, costly, and could only play back commercially prerecorded material. The endless loop concept, which made it difficult to find a precise spot on the tape, was utilized.

Bernstein (1) related that in Holland, the N. V. Philips Gloeilampenfabrieken, a giant electronics firm, was developing an improvement over the automobile cartridge system. The objective was to find a compact and convenient means for handling tape. These efforts produced the cassette tape recorder, a system which consists of a miniature plastic container measuring only 4 by 2-1/2 by 7/10 inches. In this type of recorder, the tape travels from one hub to another. This device provides not only a beginning and an end to the tape,

but also makes possible the important feature of offering both recording and play back functions. The first tape machine utilizing this principle was the "Carry Corder" made by Norelco of North American Phillips late in 1964. This tape machine was marketed under the term "cartridge" and continued under this term for the next 18 months. The term cartridge was also being used to describe two other cartridge systems on the market at this time.

Bernstein (1) reported that to dispel the confusion created by three different systems under the same name, North American Phillips resolved to choose a new generic term for the miniature hub-to-hub reel system. "Cassette," meaning "little case," was the European term for the miniature system. North American Phillips adopted "cassette" and publically announced the descriptive term in July, 1966. Bernstein related that the cassette system was being made available without licensing fees to "all qualified marketers of tape equipment who agree to adhere to the rigid standard developed for it." At this time 39 major marketers adopted the concept. Today, there are more than 90 manufacturers of the cassette system. In 1967, only one year after the public presentation of the cassette system, one-fourth of all tape recorders sold were cassette tape recorders. This number exceeded that of all types of tape recorders sold in the year of 1961.

McClurg (21) noted that by the year 1968 the use of cassette tape recorders began to make an impact on the market. Martin (20) noted that "there was a market waiting for the compact, economical portable machine. Students, teachers, executives and conventiongoers [sic] began using them in classes, meetings, and on trips."

Unique Advantages of the Cassette Tape Recorder

The cassette tape recorder, which originated from the cartridge system, the reel-to-reel system, the magnetic wire, and the phonograph record, in the order given, is a significant improvement in the area of recorded sound (24). Martin (20) maintained that the cassette tape recorder is rapidly becoming the most popular and ubiquitous new educational tool.

Erickson (9) observed that the reel-to-reel tape recorder, which has been used for educational purposes since its beginnings in the early 1950's, is widely accepted as an excellent teaching tool. The cassette tape recorder, however, has many advantages over the reel-to-reel machine. In judging the service of a recording device, Mills (24) noted that an important consideration is the sound quality. McClurg (21) reported that the cassette tape recorder possesses sound quality equal to that of a 45-rpm record played on a portable record player, and in comparison to the average home radio,

the cassette tape recorder has a superior sound quality. However, in comparison to a modern stereo record played on a high fidelity system, Mills has stated that the sound of the cassette tape recorder is not equal in quality. As noted by Mills, the cassette tape system was developed for convenience and not for concert-hall sound. The sound quality is very adequate for the uses for which the cassette tape recorder was developed.

Another important feature of the cassette tape recorder is its ease of operation. One needs only to snap the cassette tape into the appointed place and press a button. The cassette tape recorder is free of certain problems present in the reel-to-reel tape system, such as threading of the tape, or of the problem present in the phonograph record of placing a needle in a groove.

In addition to the three above named features, the cassette tape recorder presents other important functions which insure its usefulness. According to McClurg (21), erasure of a pre-recorded cassette tape is impossible because a removable tab on the back of a cassette serves as a record interlock. Mills (24) reported another important feature, the friction clutch, which prevents the tape from tearing. When the one-eighth inch tape has unwound fully, at its one- and seven-eighths inches per second speed, from one reel to

the other, the friction clutch stops the tape automatically without breaking it or tearing it loose.

Probably the most important advantage of the cassette tape recorder is the function of recording as well as of playing back sound. In addition, the cassette tape recorder has all the usual features of other tape recorders. Mills (24) pointed out that since the cassette tape recorder is transistorized, with solid state circuitry, instant sound with no warm-up delay is a feature. Each time a recording is made, any previous recording on the tape is automatically erased. The fast forward or rewind mechanisms, operated by push button controls, can be used to pinpoint some special part of the full tape. Mills also noted that a cassette tape can be played more than twice as long as a long playing record without changing the tape or turning the tape over. This feature is possible with less maintenance than is required for a phonograph record.

Mills (24) stated that the low cost of the cassette tape recorder makes the process of recording and playing back sound more widely available than ever before in the history of sound reproducing mechanisms. In 1969, cassette tape recorder prices started at \$30, and only a few models cost more than \$100. According to Mills, the low cost and the many advantages of the operation of a cassette tape recorder make

it possible for the teacher to build a personal library of audio materials and permit their use with students without the elaborate preparations other machines require.

Uses of the Cassette Tape Recorder

Varieties of uses.--Efforts to locate information on controlled experiments utilizing the cassette tape recorder for instructional purposes have been made by the author. Although few reports have been published, it is evident, from the articles available in periodicals of the last two years, that the cassette tape recorder is being used in many schools, from elementary grades through the college level. Uses of the cassette tape recorder have been reported by McInnis (22), Halasz (12), Hammond (13), and Head and Runquist (14).

In the early part of 1969 McInnis (22) of Kendall College, located in Evanston, Illinois, attempted a survey to determine the extent of the use of the cassette tape recorder for instructional purposes. Questionnaires were sent to 400 members of the National Education Association's Department of Audio-Visual Instruction. More than half of the 116 respondents to the survey indicated that their schools used cassettes only for non-instructional purposes. McInnis (22) reported that

The two largest users among the respondents were collegiate institutions, both of which used the machines mainly in audio-tutorial laboratories

(St. Louis Junior College District-80 machines; University of Illinois College of Agriculture-48 machines). The next two largest users were school districts, one of which used 30 machines for kindergarten and first grade story-listening, and the other of which used 20 machines for individual instruction purposes. Only three other users employed more than 10 machines for a variety of classroom purposes. Four respondents indicated utilization of five or six machines, 17 reported that their institutions used two to four machines, and 12 reported only one machine in use.

Forty per cent of the responding institutions in the McInnis survey (22) were colleges and universities; 36 per cent secondary schools; and the remainder, elementary schools. Machine utilization, by type of institution, was as follows: 63 per cent by colleges and universities, 13 per cent by secondary schools, and 24 per cent by elementary schools. Exempting the four above mentioned large users, machine utilization was 50 per cent by colleges and universities, 30 per cent by secondary schools, and 20 per cent by elementary schools.

The principal instructional applications, either being used or anticipated, were in audio-tutorial situations, speech and journalism classes, language laboratories, and secretarial classes. Other instructional applications reported by four or less institutions included making up missed classroom sessions, commentary on filmstrips, and slides, self-assessment of teaching techniques, tape-guided field trips, music appreciation class assignments, use with homebound students,

grading written assignments, introduction of quoted materials into lectures, exercises for language students and special instruction for slow learners.

Halasz (12) related that in the Norwalk Connecticut school system tape instruction has been used since the early 1950's. Muro (25) estimated that at the present time approximately half the teachers in the Norwalk schools are using audio tapes. The low cost and portability of the cassette make this tape recorder a great asset for use in the primary grades. Butler (5), another teacher in the Norwalk system, reported that in the summer of 1967 one-week tape workshops were held for interested members of the Norwalk school staff. Subjects for the workshop included uses of tape teaching as an extension of the teacher and the preparation of a quality script. Drowne (7), also of the Norwalk school system, reported that Norwalk educators have recognized for some time that the proper use of tapes is one of the most effective ways to improve education.

Hammond (13), professor of English at Wichita State University, published procedures and results in the use of cassette tape recorders for required term papers and for practice in the reading of poetry. Eight cassette tape recorders and some tape had been set aside either for the use

of members of the class in the Audiovisual Center or to be checked out for several days at a time. Hammond reported

The outstanding advantage felt by both students and instructor is in the personal exchange of ideas, questions, and answers. The recorder makes it not only possible but unavoidable to treat students individually, especially with the instructor's taped reply to each student's assignment. A further effect is that of immediacy, gained by asking the student to listen to his own recording first and then to the instructor's reply following it on the tape. . . . There was a noticeable improvement in the speaking style of most of the students. . . . Better organization of ideas and smoothness of expression were evident in several student's taped work.

Coffelt and Hudson (6) reported successful use of cassette listening centers at the Tarrant County Junior College, located in Fort Worth, Texas. Advantages of the cassette system over the traditional tape recording systems are numerous, according to these authors. Some of the advantages enumerated by Coffelt and Hudson were as follows: first and foremost, the cost factor; elimination of a number of problems normally associated with large systems; providing for student control of the program; making possible an additional service, that is, programmed instruction; less maintenance; system expansion less of a problem; elimination of multiple speed transports in the control room; duplication of recorded programs onto the student's own tape recorder simply a matter of providing a sufficient number of patch cords; and less storage space required for the cartridge tape.

The most interesting reported use of a cassette tape recorder as related to the purposes of the present study was by Head and Runquist (14) of Hamline University, located in St. Paul, Minnesota. These authors reported the use of a cordless cassette tape recorder with taped instructional material for the teaching of chemistry as follows: laboratory procedure tapes, tapes on instrument operations, and chemical safety lectures on tape.

McInnis (22) emphasized that the potential for communication for the cassette tape recorder has yet to be widely accepted by educators. The survey by McInnis in 1969 revealed that educators view the cassette as a miniature recorder with little awareness that this recorder can accomplish things that the reel machine is unable to achieve. At Kendall College, the cassette tape recorder is viewed as a valuable "instructional tool, an instrument of communication which moves rather than stores information."

Instructional uses.--Wittich and Shuller (34) stated that of all the electronic devices presently available to an imaginative teacher, perhaps none offers more versatile opportunities for creative teaching than the tape recorder. These authors view the tape recorder as a modern-day genie at the beck and call of learner and teacher. A number of objectives, techniques, and learning experiences have been

reported by teachers in the use of the tape recorder for instruction. The number and variety of instructional uses may be greatly expanded in the future.

Yoakum and Simpson (35) stressed the use of the tape recorder to motivate learning by stating that the proper selection and use of the tape recorder often makes an otherwise dull recitation an interesting learning activity. Teachers who have not used these aids in their classes do not realize the value of these devices in motivating learning as well as in clarifying ideas which may otherwise be very confusing to the pupils. Halasz (12) also emphasized the fact that the use of a tape recorder may add the spark of interest that motivates learning.

Wittich and Schuller (34) stated that the use of pre-recorded tapes provides expansion of the teacher's time. Huebener (15) maintained that a tape recording is valuable because

. . . it expands the repetitive force of the teacher's voice beyond his own physical limitations. A tape can be used all day long if need be. The tape adds a new potential to listening. It makes listening available to the student at times other than when the teacher is present and is speaking.

The above technique was examined by Erickson (9). A tape recorder was employed to play an instructional tape prepared

by the teacher to be used in a small or large group while he was at work in another area. Sabine (29) also emphasized that every labor saving technique possible is needed by the teacher of large groups to release time for small conferences and individual help. Halasz (12) pointed out that the teaching tape is an extension of the teacher, not a replacement of him.

Tape teaching offers opportunity to individualize the teaching situation. Halasz (12) emphasized that a unique quality of the tape recorder is its personal, individual approach to the learner. As the child listens, he enjoys hearing the teacher's voice talking only to him. Wittich and Schuller (34) asserted that the pre-recorded tapes are a superior medium for enabling the teacher to individualize instruction. According to Reiffel (28), a tape recorder, the cassette in particular, individualizes instruction while also making the recording easy to manage. By the use of a tape recorder, a personal, individual response between the pupil and teacher can evolve.

Huebener (15) stated that the major advantage of the use of tapes lies in the identical experiences in rehearsing the recorded tapes. This is possible only with a machine. It is well known that some pupils must have material explained more than once. A tape recorder can provide this important

repetition and drill without making excessive demands on the teacher's time. Troy (32) explained that "instant replay," a term familiar to most television sports viewers, can be used to discuss, reinforce, or challenge a concept or skill.

According to Coffelt and Hudson (6), a cassette tape recorder, because of the simplicity of operation, gives the student the important feeling of participation by making possible student manipulation in the teaching-learning process. The cassette tape recorder provides self-instruction for the learner through immediate feed-back and evaluation.

The problem of assisting the mentally gifted student to move ahead at his own speed can be met with the use of teaching tapes. Emerson (8) reported that the use of tape recorders have aided the mentally gifted children in the Downey Unified School District, California, to attain a 200 per cent increase in learning speed. Wittich and Shuller (34) observed that gifted children may be identified and helped to progress at their own pace and into their own areas of interest by presenting them with pre-recorded materials. The use of "take home" tapes for this purpose was explored by Muro (25) of the Nathan Hale Junior High School of Norwalk, Connecticut. Muro reported that a fifth or sixth grade student can learn typing by taking home a set of 12 tapes to teach himself on the family typewriter. The success at the

above school has been sufficient to merit enlarging the program to include the study of semantics through the use of tapes.

Additional drill or memory experience needed by the slow learner can be provided by presenting these pupils with pre-recorded materials. Wittich and Shuller (34) stated that as the teacher prepares pre-recorded drill material, the specific needs of individual pupils should be considered. The tape recorder can easily provide the additional repetitions necessary to facilitate learning for the slow learner.

The ready accessibility of taped lessons simplifies the problem of helping the pupil who has been absent from school to cover the work missed. The importance of knowing that the pupil who was absent has covered the exact material of the missed lesson is valuable to the teacher when it is time to evaluate that student. Bignall (31) of the Manistiques High School of Manistiques, Michigan, reported that taped lectures were substituted for live instruction in biology classes when the teacher was absent from school. The most important result, according to Bignall, was the continuation of classes as usual. The teacher knew exactly the material covered in his absence.

Perhaps the most impressive use of the tape recorder as a teaching instrument is for self-evaluation. Wittich

and Schuler (34) affirmed that the tape recorder makes it possible for the teacher and pupil to hear themselves as others hear them. The tape recorder can be used as a self improvement device both for the teacher and the student. Johnson (16) reported that at Cuyahoga Community College and Roger Williams Junior College of Rhode Island, instructors recorded class sessions on audiotapes as an aid to improving their teaching. Each faculty member rated his own classroom performance by listening to one-hour tapes of his teaching recorded at two separate periods during the semester.

The advantages for using tape recorders for classroom teaching can be summarized by Erickson (9) who stated that teachers who use the audio program medium must plan creatively to include such presentations into their overall instructional schedule. Audio-technology provides the teacher with interest-compelling devices for expansion into a wide variety of learning activities.

Place of Technology in Educational Change

An abundance of aural stimuli reaches into the daily lives of the American people. Aural experiences are the result of expertly prepared mass media communications. Today's students accept skillfully prepared materials as commonplace. Student backgrounds, broadened by these constant aural stimuli,

present real competition to the classroom teaching situation. Brown, Lewis and Harclerod (3) explained that

. . . many contacts with skillfully prepared media productions outside of formal education lead students to expect high technical quality in media presentations and teacher presentations in the classroom. These teachers must be well prepared and highly organized, with their objectives clearly defined and with materials carefully selected or designed to assist students in achieving those objectives.

Teachers of all grade levels are presented with a need for excellence in their functions as never before. Strain (30) emphasized the idea that students exposed to aural stimuli reflect an audience attitude toward all aspects of learning, including the teacher's instruction.

Educational research must be directed to the future. A position taken by Bright (2) is that the swiftness with which changes are developing in society and technology demand that educators proceed to the task with all deliberate speed.

A close look at the function of technology in tomorrow's instructional processes will result in a close look at the role of the teacher. Bright (2) proposed that

. . . the real promise of educational technology is that it can do enough of the routine teaching to leave the teacher time to concentrate on helping students develop their creative and communicative abilities. When the newer media are used to the maximum, the teacher should never need to stand in front of a class presenting information. The

mere presentation of information, refined by feedback and revived sequences, can be done by the media. This can leave the teacher free to lead discussion groups where students express their ideas and ask questions.

Educational changes brought about by the changing needs of society should be deliberate and systematic. Research must be conducted to assure that changes are objective and sound. This new media provided by technological objectives should serve education; education should not serve the media.

Bright (2) maintained that

. . . at the same time technological advances and social complexities demand curriculum change, the newer media offer us important tools for providing a scope, depth, and diversity of learning never before possible in our schools. . . . Perhaps the chief value of the emerging educational technology is that, properly researched and developed, it has the potential for giving the teacher time for the really important things, the things that cannot be done by a book or a machine.

TERMINOLOGY

The following terms are defined for the purposes of this study:

Aural stimuli--messages to the listening centers of the brain.

Auto-instructional--technique of using a cassette tape recorder to enable the individual to "teach himself."

Cartridge tape--a reel-to-reel magnetic tape inside a standardized, two-and-a-half inch by four by seven-eighths inch plastic case.

Cassette tape recorder--a small portable recording device using cartridge tapes which are inserted into an appointed position and then played by push button controls.

Listening center--a portable multiple station hearing device with headphones and volume controls.

PURPOSE

The overall purpose of the present study was to explore the effectiveness of a cassette tape recorder as a technique for enriching the quality of homemaking instruction at the junior high school level. The sample was composed of 55 students enrolled in homemaking classes in foods during the 1970 spring semester of the Highland Park Junior High School, Dallas, Texas. A teaching unit on "The Egg: Nature's Masterpiece" was developed for the study. A test instrument designed by the author was used as a pretest and as a post-test. The specific purposes of this study were to answer the following questions:

- 1) Can a cassette tape recorder enable a teacher to prepare aural instructional materials of excellent quality?
- 2) Can a cassette tape recorder enable a teacher to prepare aural aids away from school?
- 3) Can a cassette tape recorder enable students to operate these materials for review?
- 4) Can a cassette tape recorder enable a class to discuss, reinforce, or challenge a concept or skill through the use of "instant replay"?

- 5) Can a cassette tape recorder provide additional work for more gifted students?
- 6) Can a cassette tape recorder enable a teacher to present material consistent in content to several sections of the same class?
- 7) Can a cassette tape recorder reinforce instructional materials for the slow learner?
- 8) Can a cassette tape recorder provide coverage of lessons missed by a student absent from class?
- 9) Can a cassette tape recorder enable the teacher to make a self evaluation of classroom activities?

CHAPTER II

P R O C E D U R E

The present study was undertaken to determine the efficacy of the cassette tape recorder as a device for the teaching of homemaking at the junior high school level. The sample consisted of 55 girls, ages 13 and 14 years, enrolled in the eighth grade homemaking classes in foods at the Highland Park Junior High School, Dallas, Texas. The Highland Park Junior High School is the only junior high school in the Highland Park Independent School District. This school district includes five elementary schools and one senior high school. The Highland Park Independent School District serves the municipalities of Highland Park and University Park, each an independent enclave suburb of the greater Dallas metropolitan area.

Approval for the study was secured by the author from the administration of the Highland Park Independent School District. Sanction was given for the use of the intelligence quotient scores and for the conduct of the investigation.

A total of 55 girls comprised the four eighth grade classes included in the study. The four classes were

divided into two groups, matched according to the intelligence quotient scores of the individuals composing the two groups. One group was selected to serve as the experimental group, the other as the control group. The cassette tape recorder was used as a teaching tool with the experimental group, while the control group was taught by conventional teaching methods.

For the purpose of determining the effectiveness of the use of a cassette tape recorder as a technique in the teaching of homemaking, a two-week teaching unit on the subject of "The Egg: Nature's Masterpiece" was selected by the author as the subject matter for the study. Teaching plans were formulated to cover objectives, learning experiences and evaluation.

Methods employed for the teaching of both classes were teacher demonstrations, student laboratory experiences, discussion and a wide use of illustrative materials. The traditional lecture method was used in presenting information to the control group. Taped lectures, prepared by the investigator, were presented to the experimental group. In addition to the taped lectures, review teaching tapes and "take home tapes" for home experiences were prepared by the author and presented to the experimental group. An eight-station listening center for review purposes was used for the experimental

group. Both groups were given identical assignments. Each student was assigned the construction of a poster for the first week and a booklet for the second week. In all other aspects conventional methods of teaching were employed. At the conclusion of the unit of study each girl wrote either an essay or a poem on some portion of the material covered.

Preparation of the tapes followed the objectives determined for each day's lesson. Research of current literature provided background information for each portion of the lesson plan. A script for the prospective tape was written, read through aloud for analysis and timing, and then re-written.

The next step was the actual taping of the information. The author recorded the tapes ad lib from a topical outline of the prepared script. The content of the tape included attention holding devices such as vocal inflections for expressing humor, suspense, and empathy.

When each tape was completed, it was played and examined for errors or imperfections. When alterations could be made, this was done by carefully re-recording the desired sentences over the portion which needed deletion. Only the best quality tapes were retained; others were discarded. The experience of remaking tapes resulted in a more successful product as additional tapes were recorded.

A test instrument, constructed by the author, was administered as a pretest and as a post-test for the purpose of testing the gain in knowledge of the two groups, the experimental and the control. The test instrument, consisting of five parts, contained true-false statements; multiple choice, matching and completion items; and story problems. The t-test was used to analyze differences between the experimental group, which was taught with the tape recorder, and the control group, which was taught by conventional methods, without the use of a tape recorder. Mean differences in test scores were analyzed initially and following the completion of the teaching unit. A copy of "The Egg: Nature's Masterpiece" (Unit Test) follows.

T H E E G G : N A T U R E ' S M A S T E R P I E C E

(UNIT TEST)

Part I: True-false

Read the following statements carefully. Cross out the T if the statement is true. Cross out the F if the statement is false.

- T F 1. The protein of eggs is of an excellent quality.
- T F 2. A large air cell indicates that an egg is fresh.
- T F 3. The color of an egg shell does not influence nutritive value or egg quality.
- T F 4. Candling is a method used for determining the interior quality of an egg.
- T F 5. A maximum amount of leavening results when egg whites and egg yolks are beaten separately.
- T F 6. Three egg yolks should be used to substitute for one whole egg when using eggs as a thickening agent.
- T F 7. A hard meringue contains more sugar than does a soft meringue.
- T F 8. Washing an egg removes a protective film.
- T F 9. The yolk of a fresh egg stands higher when placed on a dish than does the yolk of a stale egg.
- T F 10. An egg white is a better choice of an ingredient than an egg yolk when preparing mayonnaise.
- T F 11. Eggs lose their excellent nutritive qualities as they become older.
- T F 12. Nutritionists recommend that a person needs from 4 to 7 eggs per week.
- T F 13. Egg yolks are fed to young babies because they contain iron.
- T F 14. The white of an egg is thickest when the egg is fresh.

- T F 15. A grade AA egg remains fresh whether stored at room temperature or in the refrigerator.
- T F 16. Properly beaten whites have a dry, crumbly appearance.
- T F 17. The behavior of proteins when heat is applied accounts for the changes that occur during the cooking of eggs and egg dishes.
- T F 18. Egg production is highest in the winter months.
- T F 19. Baking powder is a complete substitute for eggs.
- T F 20. An egg should be stored with the small end up.

Part II: Selecting the Correct Answer

1. Below is a list of nutrients. Place a check in the blanks before which eggs are a good source. Do not check those not found in eggs.

<input type="checkbox"/> Protein	<input type="checkbox"/> Vitamin C
<input type="checkbox"/> Fat	<input type="checkbox"/> Vitamin D
<input type="checkbox"/> Carbohydrate	<input type="checkbox"/> Calcium
<input type="checkbox"/> Vitamin A	<input type="checkbox"/> Phosphorus
<input type="checkbox"/> Riboflavin	<input type="checkbox"/> Iron

2. Below are two phrases which describe fresh eggs and eggs "not so fresh." Place a check before those phrases which describe a fresh egg.

<input type="checkbox"/> Flattened yolk	<input type="checkbox"/> High, rounded yolk
<input type="checkbox"/> Shiny shell	<input type="checkbox"/> Chalky shell
<input type="checkbox"/> Thick viscous white	<input type="checkbox"/> Thin, watery white
<input type="checkbox"/> Covers a large area	<input type="checkbox"/> Covers a small area
<input type="checkbox"/> when broken	<input type="checkbox"/> when broken
<input type="checkbox"/> Air cell not more than 1/8" in size	<input type="checkbox"/> Air cell more than 1/8" in size

Part III: Matching

Eggs are used as an important part of many types of food products. Below are dishes which require the use of eggs for

their preparation. In each product, the egg serves a certain purpose. Fill in the blanks by selecting the main function the egg serves in the preparation of each dish listed.

- | | |
|---|-------------------------------|
| <input type="checkbox"/> Puffy omelet | 1. Thickening agent |
| <input type="checkbox"/> Poultry dressing | 2. Leavening agent |
| <input type="checkbox"/> Souffle | 3. Emulsifying agent |
| <input type="checkbox"/> Mayonnaise | 4. Binding agent |
| <input type="checkbox"/> Baked custard | 5. To slow down or hinder the |
| <input type="checkbox"/> Croquettes | formation of sugar crystals |
| <input type="checkbox"/> Parfait | |
| <input type="checkbox"/> Puddings | |
| <input type="checkbox"/> Divinity | |
| <input type="checkbox"/> Soft custard | |

Part IV: Completion

In the following statements, select one or more correct answers. Mark a cross (X) over the letter before the correct answers.

1. Eggs lose quality quickly when kept:
 - A. At a high humidity
 - B. At room temperature
 - C. Near onions
 - D. At low humidity
 - E. At 35 degrees F.

2. Grade AA or fresh, fancy eggs are preferred to other grades for the following products:
 - A. Fried eggs
 - B. Meat loaves
 - C. Poaching
 - D. Poultry dressing
 - E. Meringues

3. The following terms may be used when describing the weight of a dozen eggs:
 - A. Small
 - B. Fresh, fancy
 - C. U. S. check
 - D. Premium
 - E. Jumbo

4. One large egg gives approximately:
 - A. 30 calories
 - B. 65 calories
 - C. 80 calories
 - D. 72 calories
 - E. 70 calories
5. When making a souffle, combine beaten whites with other ingredients by using:
 - A. Stirring motion
 - B. Whipping motion
 - C. Folding motion
 - D. Beating motion
 - E. Blending motion
6. Candling is a process used to determine:
 - A. Weight of eggs
 - B. Quality of eggs
 - C. Size of eggs
 - D. Grades of eggs
 - E. Nutritive value of eggs
7. The substance in eggs which coagulates when heated is:
 - A. Riboflavin
 - B. Opaque
 - C. Protein
 - D. Viscous
 - E. Niacin
8. Extra large eggs weigh:
 - A. 30 ounces per dozen
 - B. 27 ounces per dozen
 - C. 24 ounces per dozen
 - D. 21 ounces per dozen
 - E. 18 ounces per dozen
9. When making a meringue, sugar is beaten into the egg whites in order to:
 - A. Dissolve the sugar
 - B. Produce a stable foam
 - C. Decrease the possibility of overbeating
 - D. Increase volume of egg whites

10. When scrambling eggs, the desired consistency will be obtained by:
 - A. Cooking fast with constant stirring
 - B. Handling to obtain large soft curds
 - C. Stirring constantly
 - D. Shaking the pan
11. A hard cooked egg reveals the quality of the egg by:
 - A. Texture of the yolk
 - B. Position of the yolk
 - C. Rubbery white
 - D. Size of the air cell
12. A plain baked custard should be:
 - A. Baked in a pan of hot water
 - B. Baked and cooled in a pan of hot water
 - C. Baked without a pan of hot water
 - D. Baked in a pan of hot water and removed from the pan when taken from the oven
13. When egg whites are to be beaten, they must be free of any portion of the yolk because:
 - A. Egg yolk will spoil the color of the finished product
 - B. The presence of the fat prevents foam formation
 - C. Fat spoils the flavor of the product
14. A soft custard is done when:
 - A. It reaches the boiling point
 - B. An inserted knife comes out clean
 - C. It coats the spoon

Part V: Story Problems

Place an X over the letter in front of the correct answers.

1. Mary made a baked custard. She thought she had mixed and prepared it properly, but when it was finished, it was watery. Mark an X over the letter in front of the probable cause:
 - A. Cooked at too high a temperature
 - B. The eggs were beaten only slightly
 - C. Too much egg was used
 - D. Cooked without a water bath

2. Kate made a chocolate pie. The filling was made using flour and eggs. It was curdled when finished. Kate's mother told her it was because:
 - A. The starch paste was cooked too long
 - B. The beaten egg was added rapidly to the cooked starch paste
 - C. The filling was cooked rapidly and at a high temperature
3. Mary made mayonnaise and found that it was curdling. She stopped and read carefully in her foods book to learn the causes of her trouble. She learned it was because she:
 - A. Added droplets of oil at first
 - B. Used very cold oil from the refrigerator
 - C. Used lemon juice at the start of beating
 - D. Added oil too rapidly
4. To correct her problem, Mary then:
 - A. Added more oil to the curdled mixture
 - B. Added another yolk to the curdled mixture and continued beating
 - C. Added the curdled material very slowly to a fresh yolk and continued beating.
5. Sue was asked to bring deviled eggs to a church picnic, but she forgot about her promise until about 45 minutes before the picnic. She put the cold eggs from the refrigerator into a pan of cold water, covered it, and placed the pan over high heat. In 20 minutes she returned to the stove, cut off the heat, and the phone rang. She left the eggs in the hot water and answered the phone. It was 10 minutes before she returned to remove the eggs. Mark an X in front of the letter before each of the following phrases which best describe the condition of the eggs when Sue began to shell the eggs.
 - A. Cracked shells with white coming out
 - B. Appetizing appearance
 - C. Green color on outside of yolk
 - D. Firm, yet tender white
 - E. Mealy yolk
 - F. Rubbery white
 - G. Smooth yolk

CHAPTER III

P R E S E N T A T I O N A N D A N A L Y S I S O F D A T A

The purpose of this study was to determine the effectiveness of the cassette tape recorder as a technique for improving the quality of instruction in homemaking at the junior high school level. In order to accomplish this purpose, data were collected in several ways.

The first source of data was the intelligence quotient scores of the subjects which were used for dividing the sample into two groups, an experimental group and a control group. The experimental group was taught with the aid of a cassette tape recorder; the control group without a cassette tape recorder. In all other aspects, conventional methods of teaching were employed with both groups.

The second source of data was secured from scores obtained from a test designed by the investigator covering the subject of study, a teaching unit entitled, "The Egg: Nature's Masterpiece." The unit of study covered a time period of two weeks. The test was administered initially before the unit was taught and again as a post-test following

the conclusion of the study. The test included a total of 75 scoring points.

The sample was composed of 55 girls enrolled in four eighth grade homemaking classes in foods at the Highland Park Junior High School, a part of the Highland Park Independent School District, Dallas, Texas. The data were collected during the month of April in the spring semester, 1970. Homemaking in this school is a one semester course required of all eighth grade girls. The one semester course is divided into two areas of study, nine weeks for foods and nine weeks for clothing. The investigator was also the homemaking teacher for the four classes included in the study. The 55 girls comprising the sample represented one-fourth of the entire group of eighth grade girls enrolled in this school.

INTELLIGENCE QUOTIENT SCORES

The intelligence quotient scores for each class were obtained and the mean for each class determined. On the basis of these results, the classes were divided into two groups. The first and fourth period classes were designated as the control group and the third and fifth period classes as the experimental group. The control classes consisted of the group taught without a tape recorder; the experimental group was taught with the use of a tape recorder.

The t-test was applied to the means of the intelligence quotient scores of the two groups to determine if any significant differences in ability existed between the groups. Analysis of the results of the t-test revealed that there was no real difference between the means of the two groups as shown below:

<u>Group</u>	<u>Mean</u>	<u>t-value</u>	<u>Level of Significance</u>
Control	115.33	0.36	n.s.*
Experimental	113.86		
*n.s.--non-significant			

The range of the intelligence quotient scores for the control group was from a low score of 97 to a high score of 142, a difference of 45 points. The scores for the experimental group ranged from a low of 80 to a high of 132, a difference of 52 points. The mode for the control group was 99; for the experimental group, 126. The mean for the control group was 115.33; whereas, the mean for the experimental group was 113.86.

ANALYSIS OF PRETEST DATA

The test instrument was administered initially to all four classes at the beginning of the class period prior to

the introduction of the teaching unit. There were 75 scoring points in the test. Analysis of the data revealed that the mean for the control group was significantly higher than the mean for the experimental group. The t-value was significant at the 5.0 per cent level of confidence. The mean of the control group was 37.74; the mean of the experimental group was 34.29. The analysis of the differences between groups is shown below:

<u>Group</u>	<u>Mean</u>	<u>t-value</u>	<u>Level of Significance</u>
Control	37.74	2.19	.05
Experimental	34.29		

The responses on the pretest were examined following scoring of the tests. The purpose was two-fold: 1) to determine initial differences between the two groups, and 2) to determine areas in which the students were most inadequate. Knowledge of individual and group weaknesses enabled the experimenter to direct emphasis in the teaching unit upon areas of greatest inadequacies. The percentage of correct responses of the two groups on the pretest are shown in Table I.

The first part of the test was composed of true-false statements. There was little difference in ability between

TABLE I
CORRECT RESPONSES OF THE CONTROL AND EXPERIMENTAL
GROUPS ON THE PRETEST

Test	Responses by Groups	
	Control	Experimental
	Per cent	Per cent
Part I	65.93	64.64
Part II	61.82	60.44
Part III	28.52	27.14
Part IV	37.21	36.39
Part V	38.72	38.64
Total	48.20	47.19

the two groups on this part of the test. The control group answered 65.93 per cent of these statements correctly, while the experimental group answered 64.64 per cent correctly. The percentage of correct responses was highest for both groups for Part I of the test. This would be expected since the element of chance is greater for true-false items than for other types of questions.

Part II of the test consisted of multiple choice items dealing with the nutritive value of eggs and the characteristics of a fresh egg. Again there was little difference in the scores of the two groups for this part of the test. For the control group, 61.82 per cent of the responses were correct. For the experimental group, 60.44 per cent of the responses were right. Since these students had covered some areas of nutrition in a science course, it was possible that this previous instruction accounted for the somewhat high percentage of correct responses for this part of the test.

The next part of the test, Part III, was composed of matching questions dealing with the uses of eggs in food preparation. This area was the one part of the test in which the students showed the least knowledge. This was to be expected, however, as few, if any, of the girls had previous experience of any kind in food preparation. The terms in this part of the test were entirely new to the homemaking

students. The concept of eggs as used in the preparation of many different types of dishes was also an area of knowledge not experienced before by these students. The percentage of correct responses for the control group was 28.52 per cent; for the experimental group, 27.14 per cent.

Part IV of the test consisted of multiple choice items including the many phases of information on the purchasing of eggs and their care and handling in food preparation. On this portion of the test, 37.21 per cent of the responses were correct for the control group, while 36.39 per cent were correct for the experimental group. Part IV of the test contained some items which were not entirely new to the students. This may explain the higher percentage of correct responses on Part IV than on Part III of the test. On the other hand, some parts of these completion questions contained concepts of an advanced nature.

The last part of the test, Part V, was composed of five story problems. Responses for the two groups were almost identical as to the percentages of correct answers in this area, a total of 38.72 per cent for the control group and 38.64 per cent for the experimental group. Each of the five story problems dealt with areas of food preparation entirely new to these eighth grade girls. However, the percentages of correct answers would indicate some basic reasoning entered into the student responses.

PRESENTATION OF THE TEACHING UNIT

The teaching unit was designed to give students a working knowledge of the nutritive values of eggs, the purchase and care of eggs, the principles of egg cookery, and an understanding of the many uses of eggs in food preparation. The methods of teaching for the control group and the experimental group were the same in as far as teacher demonstrations; student laboratory experiences; class discussions; wide use of illustrative material; and home work assignments of posters and booklets on selected subjects were concerned.

The control group received the basic information in the form of lectures presented by the teacher. Review for the control group was also directed by teacher-led discussions. The experimental group received the basic information through the use of tapes pre-recorded by the teacher. The use of the tape recorder afforded a means for the reinforcement of material as needed by the use of "instant replay" at the request of a student. The material presented by tape was identical for the two experimental classes. While the investigator covered the same material in both classes in the control group as was covered in the tapes used for the experimental group, the lectures presented to the two control classes were quite similar but not identical. The experimental group reviewed the instructional material through the

replaying of the tapes with the use of an eight-station tape listening center. This technique made possible the reinforcement of learning for the slow learner, as well as providing coverage of lessons missed by a student absent from class. The variety of teaching techniques feasible with a cassette tape recorder and the use of taped teaching materials were the distinguishing differences in the teaching methods employed for the two groups.

The focus of the investigation was directed toward the making of tapes relevant to the teaching unit and the incorporation of these tapes into the teaching action. The preparation of the tapes involved several steps, executed in the following order: basic research on the topic for each tape; a search for novel ideas of presenting the material; writing, rewriting, editing, and timing the script by reading it aloud; the actual recording of the finished script from a topical outline of the prepared script; proofing by careful listening during replaying of the tape; and correcting the script. If a tape did not meet the quality desired by the investigator, it was discarded and a new and better tape was prepared.

In addition to the above named steps in the production of a tape, the following considerations were found to be important in the making of an effective tape:

- 1) The selection of a recorder with a sensitive microphone head.
- 2) The selection of a room or area with good acoustics. This is not always available in a school room or a room with many hard surfaces such as a foods laboratory.
- 3) The selection of a satisfactory tone setting on the recorder.
- 4) Checking and eliminating extraneous noises which might be picked up by the microphone.
- 5) Holding the microphone close to the voice, but not speaking directly into it.

To eliminate confusion concerning the order of presenting the subject matter, each tape was introduced with a number and a title. Instructions for turning off the tape recorder concluded each tape. These instructions were helpful to the student in manipulating the tape recorder. Student management of the tape recorder is an important aspect in teaching with a cassette tape recorder.

The tapes were used in other interesting ways. When a student was absent from school, she listened to the missed material on the tape recorder the next morning before class started. Advanced students requested "take home tapes" for instruction in preparing certain dishes. The investigator

prepared these tapes. The students checked out the tapes in the same manner as a book is checked out and then used the tapes on their own tape recorders at home. This procedure was limited to the 15 to 20 girls having a tape recorder available in the home. Classroom discussions and activities were also recorded on the tape recorder. The purpose of these recordings was for teacher evaluation of the overall teaching program.

ANALYSIS OF THE POST-TEST DATA

At the conclusion of the two week teaching unit, the identical test instrument used for the pretest was re-administered as a post-test to both the control and experimental groups. The improvement in scores between the initial and final test periods was determined for each group.

The percentages of correct responses of the two groups for the post-test are shown in Table II. A general comparison of the scores of the two groups indicates that both groups showed improvement. For the true-false section, Part I, of the test, the control group answered 82.59 per cent of the statements correctly, while the experimental group answered a slightly higher percentage, 84.64 per cent, correctly on the post-test. The opportunity for review through the teaching tapes may have accounted for the higher percentage of correct responses for the experimental group than for the control group on the post-test.

TABLE II
CORRECT RESPONSES OF THE CONTROL AND EXPERIMENTAL
GROUPS ON THE POST-TEST

Test	Responses by Groups	
	Control	Experimental
	Per cent	Per cent
Part I	82.59	84.64
Part II	84.62	81.87
Part III	65.56	64.29
Part IV	56.61	62.24
Part V	58.59	54.55
Total	69.88	70.76

An examination of scores for Part II of the post-test revealed a higher percentage of correct responses for the control group as opposed to the experimental group, the percentage being 84.62 and 81.87 per cent, respectively. This result may be attributed, in part, to the amount of time spent in observing a "broken-out" egg by the control group. The playing of the tapes by the experimental group required a considerable portion of the class period. Thus, there was less discussion on this particular subject than was available for the control group.

Part III consisted of matching questions dealing with the uses of eggs in food preparation. The control group had a slightly higher percentage of correct responses than did the experimental group for this portion of the test, 65.56 per cent, as opposed to 64.29 per cent correct for the experimental group. This portion was one of the most difficult parts of the entire test.

An inspection of the scores on Part IV, which consisted of multiple choice items concerned with all phases of the teaching unit, indicated that the experimental group was superior to the control group. A total of 62.24 per cent of the responses for the experimental group, as compared to 56.61 per cent for the control group, were correct. The added review afforded by the "teaching tapes" and the eight

station listening center may explain some of the differences in scores.

The last part of the test, Part V, consisted of story problems. An examination of the scores showed the control group to have a slightly greater knowledge than the experimental group. The percentages of correct answers were 58.59 per cent for the control group and 54.55 per cent for the experimental group.

The correct responses for the control group were calculated and found to be 69.88 per cent of the total possible score. The corresponding figure for the experimental group was 70.76 per cent. These figures indicate the two groups were quite similar.

A portion by portion comparison of the percentage increase in correct responses on the post-test over that of the pretest is shown in Table III. For Part I, the true-false questions, the control group made an improvement of 25.27 per cent, while the experimental group made a slightly larger gain of 30.94 per cent.

On Part II of the test, the multiple choice questions dealing with the nutritive values of the egg and the qualities of a fresh egg, the experimental group showed a gain of 35.46 per cent in the number of correct responses between

TABLE III
 INCREASE OF THE POST-TEST SCORES OVER THE PRETEST
 SCORES FOR THE CONTROL AND
 EXPERIMENTAL GROUPS

Test	Increase by Groups	
	Control Per cent	Experimental Per cent
Part I	25.27	30.94
Part II	28.56	35.46
Part III	129.87	136.88
Part IV	52.14	71.04
Part V	50.93	41.17
Total	46.02	54.48

the pretest and post-test periods. This gain was higher than the gain of 28.56 per cent for the control group.

On Part III of the test, the experimental group showed greater knowledge than the control group, with a gain of 136.88 per cent on the number of correct responses of the post-test over that of the pretest. For the control group the gain was an increase of 129.87 per cent.

An examination of Part IV of the test, the multiple choice items, showed the experimental group to have a greater gain in knowledge than the control group. The percentage gains were 71.04 per cent for the experimental group and 52.14 per cent for the control group.

The last portion of the test, which consisted of story problems, was the only part in which the experimental group showed less gain in knowledge than the control group. For this part, the experimental group showed a 41.17 per cent increase in the percentage of correct responses on the pretest over that on the post-test. The control group scored an improvement of 50.93 per cent in this area.

The total percentage increase in the number of correct responses on the post-test over that of the pretest for the control group was 46.02 per cent; and for the experimental group, 54.48 per cent. The experimental group showed a

somewhat higher overall percentage increase in the number of correct responses than did the control group, as shown in Table III.

Calculated values for the means of each of the five parts of the test instrument for the pretest and for the post-test are shown in Table IV. The mean for the control group was 13.19 on Part I of the pretest, and improved to a mean of 16.52 on the post-test. For Part II, the control group had a mean of 8.04 on the pretest and a mean of 11.00 on the post-test. Calculations for Part III of the pretest gave the control group a mean of 2.85 and on the post-test, a mean of 6.56. For Part IV of the pretest the mean was 7.81 and for the post-test the mean was 11.89. On Part V the control group made a mean score of 4.26 on the pretest and a mean of 6.81 on the post-test.

The experimental group had a mean of 12.93 on the pretest and a mean of 16.93 on the post-test for Part I. On Part II, this same group had a mean of 7.86 on the pretest and a mean of 10.64 on the post-test. For Part III, on the pretest the experimental group had a mean of 2.71 and a mean of 6.43 on the post-test, while on Part IV this group achieved a mean of 7.64 on the pretest and a mean of 13.07 on the post-test. The last portion of the test, Part V, resulted in a mean of 4.25 for the pretest and a mean of 6.00 on the post-test for the experimental group.

TABLE IV
PRETEST AND POST-TEST MEANS FOR THE CONTROL
AND EXPERIMENTAL GROUPS

Test	Group Means			
	Control		Experimental	
	Pretest	Post-test	Pretest	Post-test
Part I	13.19	16.52	12.93	16.93
Part II	8.04	11.00	7.86	10.64
Part III	2.85	6.56	2.71	6.43
Part IV	7.81	11.89	7.64	13.07
Part V	4.26	6.81	4.25	6.00
Total	37.74	53.52	34.29	52.93

The overall mean for the control group was 37.74 for the pretest and 53.52 for the post-test, a difference of 15.78 points. For the experimental group, the overall mean was 34.29 on the pretest and 52.93 on the post-test, a difference of 18.64 points. Although the experimental group had a slightly lower mean score on the pretest than the control group, the experimental group had a slightly higher mean than the control group on the post-test.

To determine the effectiveness of the teaching procedures for the two groups, the pretest and the post-test scores were compared for each group. Analysis of the results of the t-test for the control group revealed a t-value of 7.14, a highly significant difference between pretest and post-test means.

Analysis of the differences between the pretest and post-test scores for the control group is shown below:

<u>Test</u>	<u>Mean</u>	<u>t-value</u>	<u>Level of Significance</u>
Pretest	37.74	7.14	P < .01
Post-test	53.52		

The t-test was applied to the data for the experimental group to find the significance of the differences between

the two means. A highly significant difference was found between pretest and post-test means, as shown below:

<u>Test</u>	<u>Mean</u>	<u>t-value</u>	<u>Level of Significance</u>
Pretest	34.29	10.62	P < .01
Post-test	52.93		

To investigate the possible differences in the effectiveness of teaching with and without the use of a tape recorder, the post-test data were analyzed statistically. The application of the t-test revealed a non-significant difference between the two group means (control group, 53.52: experimental group, 52.93). Data analysis are shown as follows:

<u>Group</u>	<u>Mean</u>	<u>t-value</u>	<u>Level of Significance</u>
Control	53.52	0.26	n.s.*
Experimental	52.93		

*n.s.--non-significant

Data analysis indicate both groups showed a significant improvement in the amount of knowledge gained during the two-week teaching period. Although the post-test mean was slightly higher for the control than for the experimental

group, the difference between groups was not great enough to be significant.

On the basis of the data presented, it can be stated in conclusion that a cassette tape recorder as a technique for the teaching of homemaking at the junior high school level produces results equal to and as satisfactory as conventional teaching methods.

CHAPTER IV

A U N I T O F S T U D Y

THE EGG: NATURE'S MASTERPIECE

Grade level: eighth grade

Time: two weeks

Objectives

- 1) To acquire an understanding of the importance of eggs in the diet.
- 2) To gain a working knowledge of how to purchase and care for eggs.
- 3) To develop an understanding of the importance of low temperatures in egg cookery.
- 4) To provide experience in the preparation of eggs as a basic food.
- 5) To acquire knowledge of the many uses of eggs in food preparation.
- 6) To provide some experience in the handling and using of eggs in food preparation.
- 7) To gain an appreciation of the importance of regularly including eggs in the diet.
- 8) To develop an appreciation of the unique role eggs perform in food preparation.

Outline of the Teaching Unit

- I. Why are eggs an important food?
 - A. Nutritive value of eggs
 - B. Caloric value of eggs
 - C. Digestibility of eggs
 - D. Economy of eggs
 - E. Dietary recommendations
- II. How are the grades of egg determined?
 - A. Characteristics of a fresh egg
 - B. U. S. D. A. grades of eggs
 - C. Candling of eggs
 - D. Selection of grade based on intended use
- III. What are the sizes of eggs?
 - A. U. S. D. A. sizes of eggs
 - B. Size of an egg not related to grade
 - C. Selection of size based on intended use
- IV. How should eggs be handled to preserve freshness?
 - A. Natural cycle of egg production affects care of eggs
 - B. Commercial methods of preserving eggs
 - C. Proper handling of eggs from nest to consumer
 - D. Care of eggs in the home
- V. When served as a basic food, how should eggs be prepared
 - A. Poached egg
 - B. Fried egg
 - C. Scrambled egg
 - D. Hard cooked egg
- VI. What are the principles of egg cookery?
 - A. The nature of egg proteins
 - B. Effect of heat applied to egg proteins
 - C. Ability of egg proteins to perform many functions in food preparation
- VII. What are some of the uses of eggs in cooking?
 - A. Thickening agent
 - B. Leavening agent
 - C. Emulsifying agent
 - D. Binding agent
 - E. Hinders formation of sugar crystals

- VIII. How should eggs be handled in food preparation?
- A. Separation of white from yolk
 - B. Temperature of eggs to be beaten
 - C. Stages of beaten whites and beaten yolks
 - D. Methods of combining eggs with other ingredients

IX. Laboratory activities

- A. Demonstrations by teacher
 1. Eggs as an important food
 - a. Poached
 - b. Fried
 - c. Hard cooked
 2. Eggs in food preparation
 - a. As an emulsifying agent: mayonnaise
 - b. Stages of beaten egg whites: meringues, soft and hard
 - c. As an agent to prevent formation of sugar crystals: parfait
- B. Student laboratory activities
 1. Skillet scrambled eggs and toast
 2. Soft and baked custards
 3. Puffy omelet
 4. Cheese souffle

Time Block for Teaching Unit

First Day

- Objectives: 1) To stimulate a desire to study the uses of eggs in food preparation.
- 2) To gain a knowledge of the nutritional values of eggs.

Activity: Teacher--Tape or lecture: "Eggs: A Nutritional Powerhouse"

Assignment: Prepare poster on some portion of the unit. Due in one week.

Second Day

- Objectives: 1) To learn to recognize the grades of eggs.
- 2) To learn to recognize the sizes of eggs.

- 3) To gain an understanding of the preservation of eggs.
- 4) To develop an understanding of the principles involved in the preparation of eggs as an egg dish.

Activities: Teacher--Tapes or lecture: "Grades of Eggs," "Sizes of Eggs," "Care of Eggs."
Demonstration--Poached and fried eggs.

Student--Observe differences in grades of eggs when broken and unbroken.

Assignment: Issue recipes and make plans for skillet scrambled eggs and buttered toast.

Third Day

- Objectives:
- 1) To gain a knowledge of the basic principles of egg cookery.
 - 2) To provide experiences in preparing skillet scrambled eggs.

Activities: Teacher--Tape or lecture: "The Basic Principles of Egg Cookery"

Student--Laboratory: Students prepare and serve skillet scrambled eggs with toast.

Assignment: Review poster assignment.

Fourth Day

- Objectives:
- 1) To gain an understanding of the uses of eggs in food preparation.
 - 2) To develop an understanding of the use of eggs as a thickening agent.

Activities: Teacher--Tapes or lecture: "What are the Uses of Eggs in Cooking?" "How Will You Have Your Custard?"

Student--Examine illustrative material.

Assignment: Issue recipes and plan for laboratory experiences in preparing soft and baked custards.

Fifth Day

- Objective: To provide experience in the preparation of soft and baked custards.
- Activities: Student--Laboratory: Prepare soft and baked custards. Review of tapes during baking period.
- Assignment: Reminder that posters are due the next day.

Sixth Day

- Objectives: 1) To evaluate and serve custards.
2) To review and discuss material covered during past week.
- Activity: Student--Evaluate and serve custards. Review tapes. Turn in and examine posters.
- Assignment: Prepare booklets on the uses of eggs in cooking. Due in one week.

Seventh Day

- Objectives: 1) To develop an understanding of the different stages of beating egg whites and egg yolks.
2) To gain a knowledge of how beaten egg whites hinder the formation of sugar crystals.
- Activities: Teacher--Tapes or lecture: "How Shall We Beat an Egg?"
Demonstration: Stages of beaten egg whites. Soft and hard meringue: pie topping and meringue kisses. Making a parfait.
- Student--Evaluate and serve the pie, parfait, and meringue kisses.
- Assignment: Issue recipes and plan for laboratory experience in preparing puffy omelet.

Eighth Day

- Objectives:
- 1) To provide experience in beating egg whites and yolks through the preparation of a puffy omelet.
 - 2) To gain experience in combining egg whites and egg yolks.
 - 3) To gain an understanding of the importance of low temperature in egg cookery.

Activity: Student--Preparation and serving of puffy omelets. Review tapes during available time.

Assignment: Review assignment for booklets.

Ninth Day

- Objectives:
- 1) To gain an understanding of the principles involved in the preparation of hard cooked eggs.
 - 2) To gain an understanding of the use of eggs as an emulsifying agent.

Activities: Teacher--Demonstration of properly prepared hard cooked eggs. Demonstration of the preparation of mayonnaise.

Student--Serve mayonnaise on crackers.

Assignment: Develop plans for laboratory experience in preparing souffle.

Tenth Day

Objective: To provide experience in preparing cheese souffle.

Activities: Student--Prepare, evaluate and serve cheese souffle. Review tapes while souffle is baking.

Assignment: Test on the study unit to be given following class period.

Eleventh Day

Objective: Evaluate the study unit by use of the post-test.

Activities: Student--Complete booklets. Evaluate assigned booklets.

CHAPTER V

C O N C L U S I O N S A N D R E C O M M E N D A T I O N S

The purpose of this investigation was to determine the value of a cassette tape recorder in the teaching of homemaking at the junior high school level. Specifically, the cassette tape recorder was used to explore the possibilities of enriching classroom instruction in homemaking at the junior high school level to achieve the following objectives:

- 1) To enable the teacher to prepare instructional materials of excellent quality.
- 2) To enable the teacher to prepare tapes while away from school.
- 3) To enable students to review instructional materials.
- 4) To enable the class to discuss, reinforce, or challenge a concept or skill through the use of "instant replay."
- 5) To provide additional work for the more gifted students.
- 6) To enable the teacher to present material consistent in content to several sections of the same class.
- 7) To reinforce instructional materials for the slow learner.
- 8) To provide coverage of lessons missed by a student absent from class.
- 9) To enable the teacher to self-evaluate classroom activities.

The sample consisted of 55 eighth grade girls enrolled in foods classes of homemaking for the latter half of the spring semester, 1970, in the Highland Park Junior High School, Dallas, Texas. This school is a part of the Highland Park Independent School District.

To test the value of a cassette tape recorder in the teaching of homemaking, the investigator selected a two week unit of study entitled, "The Egg: Nature's Masterpiece." The four homemaking classes selected for the study were divided into two groups, one designated as the control group and the other as the experimental group. Analysis of intelligence quotient scores indicated the two groups did not differ significantly in mental ability. Data were collected by the use of a test instrument, designed by the investigator. The test instrument included a total of 75 scoring points.

The test instrument was used initially as a pretest before the study was begun and again as a post-test at the conclusion of the study. The data collected were analyzed to determine differences in knowledge gained by the two groups; namely the control group, which was taught without the use of a cassette tape recorder, and the experimental group, which was taught with the aid of a cassette tape recorder. In all other aspects, the two groups were taught by the same conventional methods of teaching.

Analysis of the intelligence quotient scores by means of the t-test revealed a non-significant difference between groups. The mean for the control group was 115.33 and the mean for the experimental group was 113.86.

The t-test was applied to the pretest scores for the purpose of analyzing the differences between the two groups initially. The difference between means was found to be significant at the 5.0 per cent level of confidence with the control group having the higher mean score. The post-test scores were analyzed by the t-test for the purpose of determining the difference between the two groups at the conclusion of the study. Results revealed a non-significant difference between mean scores following the completion of the teaching unit. However, there was a slightly greater improvement for the experimental (mean increase = 18.64) than for the control group (mean increase = 15.78). This difference was not great enough to be significant.

Data were analyzed to determine if a significant difference existed between the pretest and post-test means for both the control group and the experimental group. Analysis of the results for both groups revealed mean differences between the pretest and post-test scores were highly significant, indicating that both groups showed a highly significant improvement in knowledge of the material covered in the

teaching unit. The students in both the experimental and the control groups showed greatest evidence of improvement in the areas of nutrition and food preparation.

On the basis of the data presented, it can be stated that a cassette tape recorder as a technique for the teaching of homemaking at the junior high school level produces results equal to and as satisfactory as conventional teaching methods. The objectives of the study were met in not only this respect but in other important aspects as well.

The preparation of superior teaching materials is a natural outgrowth of using a tape recorder for presenting classroom lectures and other types of instruction. The procedure involved in the making of a quality tape challenges the teacher to improve not only the quality of the instruction, but also provides opportunity to improve her speaking ability.

A cassette tape recorder provides a practical opportunity to accomplish the unusual and the interestingⁱⁿ classroom teaching. Since a cassette tape recorder may not be available in the school budget for the homemaking teacher, the investigator believes that the low cost of this machine increases the possibility for many teachers to own and enjoy the adventures of teaching afforded by this technique. This recorder, because of its portability, enables the teacher to

prepare tapes at home and/or in a place with good acoustical qualities.

Another important facet in teaching with a tape recorder is that the teacher knows the exact material presented and can have confidence when constructing tests that the same information has been presented to several sections of the same class. This results in greater effectiveness in the overall presentation of subject matter.

Repetition has long been recognized as an important aspect of learning. A cassette tape recorder makes repetition possible in a novel and stimulating manner. The portability of a cassette tape recorder provides the possibility for additional instruction in a place away from the area of classroom activity for the students who need additional assistance. Thus, the teacher has more time to spend on other important areas of teaching. In addition, a pupil can make his own recording from material as he listens in class and use the cartridge tape at home.

The unique advantage of the use of "instant replay" which is afforded only with a tape recorder, and especially with the cassette, gives the teacher another simple yet direct method for reinforcing the learning situation. This is an appealing and stimulating technique, especially to the junior high school student.

The cassette tape recorder is an extremely useful aid in providing additional learning experiences for the mentally gifted student who must constantly be challenged by a progression of learning activities. In the present study, the gifted students were eager to use the "take home tapes" containing instructions for preparing egg dishes. The technique of teaching the student who is ready to explore new areas of learning by the use of taped material is limited only by the teacher's creativity and imagination.

The tape recorder provides a simple and effective method of enabling the student who has been absent from school to cover the material missed. This technique was used very successfully in the present study. The assistance provided for the teacher, and the confidence given to the pupil, make this technique an asset.

Perhaps the most important use of the cassette tape recorder for the teacher is that of self-evaluation. A cassette tape recorder is especially effective and practical for this purpose since the teacher can record class activities and subsequently listen to these enroute to or from school. Listening to an accurate portrayal of the actual classroom situation gives the teacher a better insight into the overall teaching program.

The investigator believes that the most valuable asset of the technique of teaching with a cassette tape recorder is that of expanding the teacher's time. This technique frees the teacher from many repetitive processes and gives more time for organizing and managing the many details necessary for effective laboratory work. If the number of students increases in the future, as predicted by educators, this advantage will become more important.

Students reactions to the techniques of using a cassette tape recorder for this study were rewarding to the investigator. The students enjoyed the tapes and made many favorable comments. Handling and manipulating the tape recorder gave them a sense of importance. One student expressed the entire concept of the investigation succinctly when she commented to the teacher, "It's better than just you." This comment is in accord with the basic concept of the investigation, "The cassette tape recorder can increase the teacher's time."

The results of this study indicate that a cassette tape recorder can be an effective technique for teaching home-making at the junior high school level. Further research into any one of the following areas might broaden the application of teaching with a cassette tape recorder:

- 1) Student attitudes toward the use of tape recorders for classroom teaching.

- 2) Enrichment of teaching materials through the use of tapes for the mentally gifted students.
- 3) Reinforcement of learning materials for the slow learner through the use of tapes.
- 4) The effectiveness of programmed teaching tapes.
- 5) The effectiveness of "take home tapes" for reinforcement of class instruction.
- 6) The effectiveness of an overhead audio system with cordless headphones for programmed laboratory instruction.

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