THE EFFECT OF COOPERATIVE PLANNING ON THE OUTCOMES OF A
PHYSICAL EDUCATION PROGRAM FOR COLLEGE WOMEN AT THE
FRESHMAN LEVEL

A Thesis Presented for the
Degree of Master of Arts

BY
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Approved by:
[Signature]
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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

In modern education teachers are becoming more and more concerned with pupils' needs and wants. These are not new terms for teachers but they are being considered in the light of what the teachers-together-with-the-pupils plan, rather than what the teachers plan for the pupils.

According to one reference in physical education literature\(^1\), "The selection of physical activities is dependent upon interests, capacities, and needs of the children". Another physical education reference\(^2\) states that, "The facilities, needs, interest, time, season, and personnel are the factors which condition and modify the play and recreation program of a community. These factors will vary with different communities and the director must plan his program in keeping with these factors".

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\(^1\) Physical Education Syllabus, Book II, Elementary Schools, Albany: The University of the State of New York Press, 1934, p. 27.

\(^2\) Play and Recreation for Children and Adults, Physical Education and Recreation, Book IV, Albany: The University of the State of New York, 1937, p. 28.
Wayman advocates that physical education programs be "person centered" and that there be a broader elective system within the required areas of activity. Bode, in describing what principles should determine the curriculum in education mentions (1) subject matter, (2) specific objectives, and (3) interest of the learner. The above citations are random selections of examples in literature, referring to the selection of class activities. Interest is often mentioned as an important factor in the choosing of activities but student-teacher planning of program is rarely discussed as being fitting and desirable, even though it may be in accordance with the writers' opinion.

Some writers suggest that program planning be a democratic process, that the students and the teacher cooperate in the selecting of program content.

3 Agnes Wayman, A Modern Philosophy of Physical Education, p. 38.

4 Boyd Henry Bode, Education at the Crossroads, pp. 543-44.

5 Charles H. McCloy, Philosophical Bases for Physical Education, p. 57.

6 Jessie Bancroft, Games for the Playground, Home, School, and Gymnasium, p. 25.

7 "Problems in American Life," America's Schools, Department of the N.E.A. Unit Number 16, p. 29.
McCloy\(^8\) supports the theory that "We learn best and like best the things in which we are interested". In his discussion of interest and doing McCloy expresses the belief that the last decade has seen sweeping changes in the theory of the teaching process in general education--many more changes in theory than in the practice. He claims that in physical education among the most emphasized methods of teaching and perhaps the least used is the project method. He found little literature developed on the project method as applied to this field, and became interested in stimulating further experimentation with this method in physical education. Kilpatrick\(^9\) states that "We must start where the child's interests are now, help him to choose the best among them, then help these to grow into something better". He continues with the declaration that the old teacher imposed his ideas while the newer one tries to build up a process more adequately creative and self-directing from within and is not concerned with repeating ground already covered.

From a random sampling of eighteen catalogs from colleges and universities having enrollments as small as


* See Appendix
fifty-one students and as large as thirteen thousand students, the writer found that nine of the small and large institutions alike offered opportunity for some selection of activities to freshmen women. Four of the small and large institutions alike inferred in course descriptions that no selection of activities was permitted by freshmen women. The five remaining colleges had enrollments under three hundred and fifty and the catalogs did not explain whether courses were prescribed for the women at the freshman level or could be selected by them.

In her earlier experience in teaching in two different colleges of approximately five hundred students, it was expected that the writer offer a variety of activities, the choice being left to her discretion.* Stimulated by the literature and faced with the problem of what physical education activities to provide, two questions arose in the writer's mind, (1) who should select the physical education activities for freshmen women, and (2) how should the selecting be managed?

Some studies have been made to determine the worth of cooperative planning in a physical education

* Bethany College, Bethany, West Virginia, and State Teachers College, Fredonia, New York.
program. 10, 11, 12 Observations were the bases for the assumptions that the pupil-teacher planning procedures aid pupils between the grades three and twelve to more adequately realize physical education objectives.

Literature on the subject of physical education curriculum planning mentions the desirability of group planning but the techniques and outcomes have not been supplied in detail. The easy path often taken by teachers is the one allowing them to decide according to their own beliefs and desires what shall be done and when it shall be done during the school year, with occasional revision of plans when requested by the pupils.

Certain practical considerations in the development of the physical education program must be made. These deal with time allotment, facilities, equipment, space, climatic conditions, state legislation and requirements for credit, community mores, staff, season,

10 The Eight Year Study, Development of the N.E.A., 1932-1940.

11 Elizabeth Smith, Pupil Planning in Physical Education, Master's Thesis, Ohio State University, 1938.

12 Helen Darrow, The Function of Physical Education in a Democratic School Program, Master's Thesis, Ohio State University, 1941.
supervision, experience, and abilities. These factors are rightfully given considerable space in manuals. Little space has been devoted, however, to the values and procedures in cooperative planning. Observations have been the main basis for claims of benefits from cooperative planning. The writer knows of no statistical reports to support or reject this theory.

THE PROBLEM

Statement of the problem. It is the purpose of this study to determine which group of college women at the freshman level more nearly attain specific physical education objectives, those participating in planning the program or those not participating in the planning.

Importance of the study. In this study an attempt is made by means of statistical evidence to determine and compare the degrees of change within the cooperative planning group and the control groups not participating in the planning of physical education activities pursued.

DEFINITIONS OF TERMS USED

Achievement. Throughout the report of this investigation, achievement shall be interpreted as
meaning accomplishment. Achievement in this sense means the difference in test scores of the same individuals or groups tested at different times. The achievement score or score change as it was in some instances, shows the relationship between the individual or group scores initially and finally. The observed differences shall be termed achievement results.

Interest. The term interest shall be used in a broad sense to refer to pleasant, unpleasant, and indifferent experiences, rather than to the more narrow meaning of only pleasant experiences.

Knowledge. The term knowledge as used in this study shall be used in the usual sense, meaning information. Knowledge change shall refer to score changes in the initial and final knowledge tests.

Measuring Instrument. Measuring instrument as used in this study shall be interpreted to mean any test or questionnaire. In this experiment expediency required the use of validated tests, that is, tests that have been proven to measure accurately what they purport to measure.

Motor Educability. Motor educability shall be interpreted as meaning the ability of individuals to learn motor skills easily and well as contrasted with individuals who learn them poorly and with difficulty.
In summary, this problem is to compare groups of college women at the freshman level; one group cooperating in the planning of the physical education program, the other groups following that program without having a voice in the planning. Three specific physical education outcomes are to be observed, namely, (1) knowledge, (2) skill, and (3) interest.
CHAPTER II

REVIEW OF THE LITERATURE

Very little has been written in regard to the democratic process in planning physical education programs. A brief summary of the findings as revealed in the literature will be given.

FINDINGS FROM PREVIOUS STUDIES CONCERNING COOPERATIVE PLANNING

In the Eight-Year Study made by the University School of Ohio State University\(^1\) it was reported that pupil-teacher planning called for a balancing process by both pupils and teachers in the democratic approach to curriculum planning. First, a survey of background and needs was found fundamental to intelligent planning. Second, criteria for choice of worthwhile group experiences were jointly set up and charted. The problem was to make sure that there was a high degree of pupil interest in the unit and that the unit was suited to individual and group needs.

\(^1\) The Eight-Year Study, University School, Ohio State University, 1932 - 1940, pp. 29-30.
Definite provisions were made for those whose needs and performance did not agree with the majority. Plans were revised as needs dictated and upon completion of units, group work was evaluated. This report states that pupil-teacher planning was an integral part of the school's democratic approach to curriculum planning.

In a similar study by the Des Moines Public Schools\(^2\) it was claimed that greater emphasis is being placed upon student planning and responsibility.

The Denver Eight-Year Study\(^3\) results show that through pupil-teacher planning both the pupils and the teacher are responsible for kinds of activities and that it is important for each member of the class to know why the problem is chosen and what his share in the study is to be. This report states that pupils learn more effectively as they share in planning their activities than when they do only what they are told to do by some experienced leader.

The Denver report describes both the weaknesses and the benefits found in pupil-teacher planning. Among

\(^2\) The Eight-Year Study, Des Moines High Schools, 1932-1940, p. 53.

\(^3\) The Eight-Year Study, Denver High Schools, 1932-1940, pp. 64-69.
the weaknesses listed were: difficulty in getting pupils to help in the planning, lazy pupils growing lazier, and some coming to feel they should do only as they pleased. Some pupils were found to have little idea of real needs, and to have too meager background to select units wisely. The report states that there was difficulty in planning ahead and in getting visual aids. Further weaknesses included: teachers not being resourceful enough, teachers feeling a lack of security, and pupils frequently lacking a plan of action in a new situation.

Benefits reported in the Denver Study included statements that initiative and independence were encouraged, the planning group grew to be a means of realizing immediate needs, and there was opportunity for guidance. The report claims that the planning situation made for democratic cooperation and for feeling of social responsibility. Other benefits listed included: development of foresight was made possible, there was chance for individualization, technique for making choices was taught, and there developed an encouraging appreciation for the abilities of others and for opportunities within the school.

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Smith states that some remnants of practice in teaching are incompatible with democratic ideals. She contends that although physical education progress has been relatively rapid, students are seldom granted the opportunity to help with planning, organization, or the evaluating of their own progress. She adds that the nature of the learning process favors pupil planning which is in keeping with the theory of interest and readiness.  

Smith's experiment was with physical education classes, grades three through six, in Elmwood Elementary School, Des Moines. She claims that pupil planning showed undeniably wholesome results. Individual progress records were kept in each activity chosen. As the experiment progressed, the attitude toward planning evidenced less impatience. Social values were observed. Unsolved features were: the lack of books for children's reference, differences in maturity of planning, and inadequate testing time. Enjoyment was the strongest motive in the children's selection of activities.


7 William H. Kilpatrick, Foundations of Method, p. 140.
Darrow\textsuperscript{8} reports that in November 1941 at Denison University, Granville, Ohio a week of physical education classes was devoted to the question of "The Evaluation of Democratic Conduct". The discussions dealt with such questions as: (1) How carefully are all procedures in the department contributing to the ideal of equality of opportunity in all dealings with students?, (2) What are we doing to develop a sense of responsibility in each student?, (3) What opportunity do we offer for freedom of choice and for self-direction?, and (4) What are we doing to teach regard and respect for the personality of others? The results of the week's discussions were reported as indicating a much more conscious effort on the part of both students and faculty toward better individual and group living.

The Darrow Report describes the newer emphasis being given to the changing of teaching method.

Likewise it was concluded in a study of twenty collegiate institutions that student-teacher planning is an advisable plan for meeting actual needs of

\[8\text{ Helen Darrow, The Function of Physical Education in a Democratic School Program, Master's Thesis, Ohio State University, 1941, p. 68.}\]
pre-service and in-service teachers. The writers suggest that there be joint planning by the students and advisors, of ALL educational activities with a view to making them contribute as much as possible to the student purposes in life.

The same writers report that although some readers might object that students are not competent or ambitious enough to make this approach feasible this was not found to be true in their study. They believe that practice and guidance would improve student ability to exercise initiative and self-direction.

In another study Klein and his associates recommend close cooperative planning between counselors and students, the examination of student goals by the students and faculty, and study of how to attain these


10 Ibid., p. 303.

11 Loc. cit.

goals. These writers\textsuperscript{13} state that since in the past there has been a sensitivity to the significance of the democratic heritage, program will more likely be an instrument for furthering the development of that heritage. Klein and his associates\textsuperscript{14} report that off-campus observing is conventional but that on campus the work is lecture or recitation type and teaching opportunity is neglected. McCloy\textsuperscript{15} seems to agree with this belief when he states that, "The last decade has seen sweeping changes in the theory of the teaching process in general education --- many more changes in theory than in the practice".

McCloy adds that physical education probably offers a more promising field to put democratic methods into effect than does classroom teaching in general because pressure to accomplish a certain amount of material by a set time is not great.

LIMITATIONS OF PREVIOUS STUDIES

A review of the literature points to increasing attention being paid to project methods in education

\textsuperscript{13} Ibid., p. 272.
\textsuperscript{14} Ibid., p. 104.
\textsuperscript{15} Charles H. McCloy, Philosophical Bases for Physical Education, p. 181.
and physical education. Appraisal in terms of accepted standards has been the method used in assuming that progress is greater when project methods are employed.
CHAPTER III

DESCRIPTION OF THE EXPERIMENTAL STUDY

Setting for the experiment. The experiment was undertaken at Fredonia State Teachers College, Fredonia, New York during the school year 1945 - 1946. The school had an enrollment of about five hundred students, one hundred of them being college freshman women. Graduates of Fredonia teach in elementary grades or teach public school music, depending upon which course is chosen. Placement in classes was not done on the basis of any examination. All of the students were native to the state of New York, with varied background in physical education, having come from communities where facilities were good in some instances and poor or non-existent in others.

The author had nothing to do with the scheduling of classes nor the placement of students in the classes. The author was the only instructor in the department for women.

Physical education courses were general in nature, including fundamentals in team sports, dual and individual activities, dancing, and exercises. All classes met twice weekly at regularly scheduled hours. They were organized
into squads with student-elected leaders. Leaders were changed at the same times during the year and leaders' responsibilities were uniform.

The school policy requires that any absence for any reason be made up within reasonable time. Uniform requirements as to costume, care of equipment, time allotment, and the like, were maintained in all groups. The environment and facilities were constant in all groups.

Groups used in the study. The experiment was begun and continued throughout with three comparable groups. The groups selected for study were three women's classes at the freshman level. Since the students were placed in groups by the administration, the selection of the groups was one of chance.

One class, which met the first hour of the week, was chosen by the instructor as the planning group. The class meeting the same days at the second hour was used as the first control group which followed plans developed by the planning group throughout the year without fail. In order to strengthen the study an extra control group was used in the experiment. The third group was the class following the first control group and its program was exactly the same as the program arranged by the planning group.
In the tables\textsuperscript{1} the entire planning group is referred to as group "WP ", while the two control groups in their entirety, in accordance with the order of the respective class periods, are designated as "WC\textsubscript{1} " and "WC\textsubscript{2} ". Exactly matched parts of each of the three groups were termed "P\textsubscript{1} " and "P\textsubscript{2} ", "C\textsubscript{1} ", and "C\textsubscript{2} ".

**Procedure for the study.** At the beginning of the first semester of the school year, initial tests were administered in motor educability to the three groups being compared. These tests were used as the basis for equation of the groups. According to McCloy\textsuperscript{2} intelligence quotients have an almost zero correlation with measurements of physical, athletic, or games ability. Inasmuch as there is no established relationship between intelligence and motor educability, no attempt was made to equate the groups on the basis of performance in tests of intelligence. The Iowa-Brace Test of motor educability is reputed to be one of the best measures so far available for equating physical education groups.\textsuperscript{3} The underlying philosophy of the test is similar to that of the Stanford-Binet

\textsuperscript{1} See Chapter V, *Results of the Experiment*.

\textsuperscript{2} Charles H. McCloy, *Tests and Measurements in Health and Physical Education*, p. 66.

intelligence test, since some skills (in the nature of stunts) are difficult and some are easy.

In McCloy's book, revised in 1944, he states that correlation of the Iowa-Brace Motor Educability Test with strength, size, maturity, and power is relatively low.\(^4\) He claims, however, that there is high correlation of motor educability with athletic ability, and assumes that individuals with similar degrees of speed, and of comparable age, size, and strength who are better in athletics are primarily better because they have greater skills or a greater degree of motor educability.\(^5\)

The Iowa-Brace tests were used because (1) they indicate motor educability, (2) they are easily and quickly administered and scored, and (3) they require no equipment.

Whole (chance) groups were compared on the basis of motor educability. These comparisons are shown in the data as (1) "W P", a group of twenty-nine individuals or cases, (2) "W C\(_1\)", thirty-two cases, and (3) "W C\(_2\)", thirty-three cases.

Additional comparisons were made with cases selected from each of the three whole groups. One method of equating groups is to pair individuals with


\(^5\) *Loc. cit.*
respect to certain test scores. The writer used this method of exact matching in attempting to counterbalance the paucity of cases and make results more reliable.

As was done in the comparisons of whole groups, exact matching was accomplished through use of motor educability test scores. These selected groups are hereafter referred to as (1) "P₁", comparing nineteen cases of the planning group, (2) "P₂", comparing eighteen cases of the planning group, (3) "C₁", comparing nineteen cases of the first control group, and (4) "C₂" comparing eighteen cases of the second control group.

The homogeneity of groups is usually shown by the mean score and the standard deviation of the test scores of each group. If these are nearly alike, the equation is accepted.⁶ In this study the data was treated in two ways, the first by the mean scores and the second by the critical ratios.

According to Garrett⁷ the mean is the best known measure of central tendency and should be used when the difference between mean abilities of groups is compared.

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The critical ratio is an accepted common method of comparison. Garrett\(^8\) explains by means of a table how many chances there are in a hundred that statistical differences are significant. He points out that a ratio of 3 indicates truly significant difference.

Discussion of the mean and critical ratio is again taken up in Chapter V, Results of the Experiment.

As has been stated before, initial motor educability scores of all groups were the basis for matching or equating groups. At the conclusion of the experiment the final scores of the identical test were compared with the first scores, changes noted, and the means and critical ratios determined in order to find which group changed more or which group improved more in motor educability.

Following the initial motor educability tests for each group studied, the experiment began with the guiding of the planning group in its selection of activities, decisions about alternate plans, length of seasons, and other considerations. The planning group was not guided into a pre-determined course of action. It was the desire of the experimenter to allow and to encourage as much student initiative as possible. It was decided at the

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\(^8\) Ibid., p. 213.
beginning of the year that unless very good reason arose, the instructor would not alter plans set up by the planning group, even though sudden changes were inaugurated by the planning group. The first meetings of the planning group were slow-moving as far as determining aims and objectives were concerned. On the whole, little time was used or needed for planning. Few decisions were reversed and there apparently was common agreement as to activities selected and the season length of each.

It was expedient in this study to measure certain changes and to ignore others. The experimenter's time and efforts and the brevity of certain selected activities were to be considered. It was also important in this study to use valid and reliable instruments of measurement and, as yet, physical education has not provided scientific tests for all activities.

Whatever was planned and accomplished in the planning group was then arranged for the two control groups which had no voice in the matter of choice or conduct of activities. The status of the experimental group and the control groups was determined at the beginning of the study of each teaching unit. These data were compared with similar data obtained at the end of each teaching unit. The aim of the writer was to test and record results as objectively and as
accurately as possible. Subjective evaluation is a worthy method sometimes used in obtaining information, however, the writer, in this particular experiment attempted to exclude errors of human judgment by using tests of the objective type.

Knowledge, skill, and interest are the specific objectives of physical education which were studied. Clarification of the means by which these outcomes were evaluated is to be found in Chapter IV, The Materials Used.

**Group planning procedure.** In the group planning, cooperative procedure was sought. Earnest attempt was made by the instructor to encourage group planning and attainment of goals. All members of the planning group were aware of goals jointly determined by themselves. McCloy\(^9\) advocates the use of the project method of procedure in physical education classes and outlines several important considerations. His first point is that aims and objectives should be known. His second point has to do with purpose and deals with class objectives, analyzing objectives into activities, arranging activities according to time, and planning them according to season. As further suggested in his outline, McCloy advises deducting the least worthwhile activities and proceeding from the known to the

unknown in activities of individual interest. Another point states that the teacher should be the guide in the project method of teaching and that she find out interests and background so that procedure can evolve from these bases. The writer found the McCloy outline useful, followed out the ideas therein, and used it as a reminder for procedure in guidance.

At the beginning of the year, discussions were held to determine what activities were wanted, when they were wanted, and how long they should be continued. Aims and objectives were set up in outline form and posted for reference. These were provided as guides to follow, after appraisal of resources, in making plans for the year. Provisions were made for the introduction of incidental activities and for changes of plans when found to be appropriate or desirable.

In describing the meaning and technique of group planning, the N. E. A.\textsuperscript{10} says, "Balance is needed between the exercise of individual freedom and its surrender in the interests of the common good through cooperative endeavor." Further explanation of the group process as

\textsuperscript{10} 1945 Yearbook, Group Planning in Education, Department of Supervision and Curriculum, Development of the N. E. A., p. 3.
described by the N. E. A.\textsuperscript{11} reads, "A genuinely democratic
group seldom votes; voting tends to emphasize disagree-
ments. It reaches agreement through discussions and con-
census, resolving conflicting interests as much as possible
and acting in accord with agreements".

According to the N. E. A., adequate attention should
be given to the expressed interest of pupils although
planning cannot be restricted to their immediate interests.
The claim is made that, "Pupils are not always the best
judges of their interests".\textsuperscript{12}

All members of the planning group were encouraged
to voice their ideas and opinions. Mild desires were
considered by the group as well as were the very decided
enthusiasms, and concensus of opinion played a major part
in decisions made. Any intolerance of minority opinions
was not evident. The instructor was prepared beforehand
with an inclusive list of possible requests. Impractical
selections were discussed before being discarded but
ready-made teacher plans were not imposed upon students.
Each suggestion was appraised by the group in terms of
appropriateness, probable outcomes, and requirements
necessary for successful completion of the work. Expressed
immediate interests were considered important yet the

\textsuperscript{11} Ibid., p. 5.

\textsuperscript{12} Ibid., p. 13.
planning group looked ahead to future needs which were stated as being dual activities, summer activities, and after graduation activities.

Some students were ready to suggest what should go into program while others were less responsive. In order to make the planning a real group process, all students were asked to contribute their own ideas in turn and to criticize and weigh suggestions whether they came from the instructor or the students. In time and with more understanding of rights and obligations, the group process became easier and quicker. Budgeting of time helped to save time. With practice, effective planning was done more rapidly. More individuals were ready to assume leadership. Some students were always willing to follow. The instructor was careful to use democratic procedure in her own work with the students. There was opportunity for group planning to encourage creativeness in both the instructor and the students.

The planning group was aware of its part in the planning but not that it was being compared with other groups which followed its plans. The control groups were not informed about the experiment being conducted. The writer felt that knowledge of the study might influence results.
Seldom did the control groups express disinterest or disapproval of their program. Few requests were made for any change of program and when these did occur, the instructor explained that the program had already been arranged for the class and it would be best to continue as planned. This explanation seemed acceptable to the students in each instance.

**Control group procedure.** The students in the two control groups were organized into squads according to results of the initial motor educability tests. This was also the manner of organization in the planning group. Leaders for the squads were elected by a majority vote in each squad and signified willingness to be squad leaders until changes were in order. The planning group leaders were elected in the same manner. Whenever the planning group altered the size of its squads or elected new leaders, the same procedure was immediately followed in the control groups. The only difference the experimenter observed was in the handling of the groups. In the planning group open discussions, until satisfactory conclusions were made, were encouraged, whereas the control groups were always informed regarding their program and how it would be taught.
The measuring instruments used in comparing the experimental group with the control groups are described in Chapter IV.
CHAPTER IV

THE MATERIALS USED

In attempting to ascertain the effect of cooperative planning on college women at the freshman level, certain measuring instruments were selected and used. These were chosen with the aim of measuring three specific outcomes of the physical education program, (1) knowledge, (2) skill, and (3) interest.

The instruments used were as follows: a test of motor educability, tests of knowledge in volleyball and basketball, tests of skill in volleyball and basketball, a check on memberships in an athletic association, a recreational interest questionnaire, and a test of social acceptance.

For convenient reference, Table I\(^1\) was prepared to show what specific knowledge and skill tests were used, for whom they are suitable, their validity and reliability, and their source. Table II\(^2\) shows other evaluations used.

\(^{1}\text{Table I, p. 31.}\)
\(^{2}\text{Table II, p. 32.}\)
### TABLE I

**SPECIFIC SKILL AND KNOWLEDGE TESTS**

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Suitability</th>
<th>Validity</th>
<th>Reliability</th>
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<td>Snell Volleyball</td>
<td>College Women</td>
<td>Criterion Expert</td>
<td>.89</td>
<td>Research Quarterly, Mar. 1936, pp. 73-76.</td>
</tr>
<tr>
<td>Snell Knowledge</td>
<td>College Women</td>
<td>Expert Opinion</td>
<td>.93</td>
<td></td>
</tr>
<tr>
<td>Bassett, Glassow &amp; Locke Volleyball Skill</td>
<td>College Women</td>
<td>Subjective rating of three judges</td>
<td>.78(\pm).02</td>
<td>Glassow and Broer, Measuring Achievement in Physical Education., p. 60.</td>
</tr>
<tr>
<td>Bassett, Glassow &amp; Locke Basketball Knowledge</td>
<td>College Women</td>
<td>Judgment of Experts</td>
<td>.67(\pm).14</td>
<td>Glassow and Broer, Measuring Achievement in Physical Education., pp. 79-82.</td>
</tr>
<tr>
<td>Colvin, Glassow, &amp; Schwarz Basketball Skill</td>
<td>College Women</td>
<td>.66</td>
<td>Satisfactory</td>
<td>Glassow and Broer, Measuring, Achievement in Physical Education., pp. 103-112.</td>
</tr>
</tbody>
</table>
### TABLE II

**OTHER EVALUATIONS USED**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progressive Education Association Interest Questionnaire, Test 8.3</td>
<td>Used in the Eight Year Study for Grades 9 - 12. (Experimental form)</td>
<td>Progressive Education Association, Chicago, University.</td>
</tr>
<tr>
<td>Women's Athletic Association Membership</td>
<td>A summation of memberships in groups studied in this experiment used as an indication of sports interests.</td>
<td></td>
</tr>
</tbody>
</table>
Following is a brief explanation of each test used in this study and mentioned on page 30.

The *Iowa-Brace Motor Educability Test*\(^3\). This test is composed of ten stunts. Directions for administering the test include arranging the groups to be tested in double lines about ten feet apart with six to eight feet between the persons in each line. Scores should be tabulated by persons opposite in adjacent lines, on scoresheets with columns for (1) the stunt number, (2) first trial score, (3) second trial score, and (4) final score. The first five stunts should be explained and demonstrated by the instructor or person in charge of the groups, then tried either once or twice, as prescribed for the first row. After the first five stunts have been attempted by the first row and scored by the second row, the second row should be given the first five stunts to try. Finally, the first row should finish doing the last five stunts. This procedure permits each row to observe five new stunts as the other row undertakes doing them.

In this experiment, no practice of the stunts was permitted before the first trials at the beginning of the study. The stunts were not tried again

until the end of the experiment when they were administered in the same manner as at the first of the year and as described here.

The Snell Volleyball Knowledge Test\(^4\). This test is composed of forty-five incomplete statements. Following each statement are five words or groups of words in parentheses, each preceded by a letter. The letter preceding the word or groups of words that makes the truest statement should be encircled. No credit should be given when two letters are encircled. If the answer is not known, no circle should be made. The final score is the number of statements correctly completed.

The Bassett, Glassow, and Locke Volleyball Skill Test\(^5\). This test calls for four concentric frames sixteen feet, twelve feet, eight feet, and four feet square laid on a regulation volleyball court. The eight foot square should coincide with the end and sidelines of the court. Heavy paper should cover alternate areas. Thirty serves are tried; fifteen to the target at the right back corner, and fifteen to the target at the left back corner. A ball striking the target area or boundary,


\(^5\) Glassow and Broer, *Measuring Achievement in Physical Education*, p. 60.
scores from the inside out, seven points, six points, five points, or four points. A ball over the net, in bounds, not on the target, scores two points. A ball over the net, out of bounds counts one point. Scores for the left and right targets can be added to find the total score for thirty trials.

The Snell Basketball Knowledge Test. This is a test of forty-five incomplete statements. Multiple choice answers are provided and the truest one is to be encircled. As in the Snell Volleyball Knowledge Test, no credit should be given when two letters are encircled and no circles should be drawn when the answer is not known. The final score is the number of statements correctly completed.

The Colvin, Glasgow and Schwarz Basketball Skill Test. The authors found the dribble and shoot for speed test the most valuable of their battery of five tests. The subject is to stand back of an eighteen foot line drawn from the mid-point of the end line and at an angle of forty-five degrees with it. Beginning from the left, the subject takes a basketball from a chair, dribbles, shoots, recovers, and passes the ball to the starting

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6 Ibid., pp. 79-82.
7 Ibid., pp. 108-112.
point where an assistant places it on a chair. The subject then runs to a similar point to the right of the basket and repeats the procedure. Three trials are to be made and the final score is the sum of the best two trials. The time is to be measured to the nearest tenth second from the command, "Go!" until the subject catches the ball after the last shot at the basket. For each basket made, two points are scored. For each ball hitting the basket rim, one point is scored.

Although the authors combine speed and accuracy into one score, these two items are measured separately in this study because they seem to the writer to be two separate measures of skill even though they are used in a combination test related to a game situation.

Women's Athletic Association Membership Report. A summation of memberships in the Women's Athletic Association is used as a simple criterion of interest. Comparisons are made of total memberships from the experimental group and the controlled groups. The results appear in Chapter V, in table form.

The association is open to all women in the college and aims to (1) provide fun in competition, (2) provide opportunity for skill development, (3) provide opportunity to meet other students socially, and (4) to

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8 Organization at Fredonia State Teachers College, New York, where the study was conducted.
increase appreciation for proper health habits. In addition to the president, vice-president, secretary, and treasurer, the membership elects at the beginning of the school year, a sports coordinator and a manager for each team sport, each dual sport, each individual sport, and each group activity such as skiing, hiking, skating, swimming parties, and dance groups.

Students are largely responsible for assisting with the equating of teams, providing student officials for games, keeping complete records of activities, coaching, and sportsmanship.

Some form of activity is provided for the members on an average of once each week. The board of control meets for an hour every two weeks to discuss plans and to evaluate program. This board is composed of the association officers together with the various sports managers, the sports coordinator, and the sponsor.

A banquet is held at the end of the school year. Students are in charge of all arrangements for the banquet, the president serving as general chairman and the sponsor serving as advisor. Highlights of the program are the entertainment by selected members of the organization, original songs, the ceremony of each manager presenting to the president her record of the year's
activity, and the awarding of emblems and letters to those members who have accumulated sufficient points through participation in the activities, through officiating, and through managing sports.

The Progressive Education Association Interest Questionnaire, (P.E.A. TEST 8.3)\textsuperscript{9}. The P.E.A. TEST 8.3 published by the Progressive Education Association lists two hundred and one items on games and sports. The last thirty items in the questionnaire are not used in computations for this study since they deal exclusively with professional leadership interests. The setting for this study was in one of the state colleges specializing in training music and elementary teachers. Two other state colleges provide professional training in physical education.

Interest in the doing of the first one hundred and seventy items was noted and averages computed for all the groups concerned. This method was followed for both the initial and final test. No effort was made to find close statistical meanings because minor inaccuracies were discovered in the marking of some of the tests. However, the results are used as an indication of interest.

The P.E.A. Test 8.3 was selected as an appropriate one to use because it is especially comprehensive in

\textsuperscript{9} Progressive Education Association, Evaluation of the Eight-Year Study, University of Chicago, Chicago, Illinois.
scope. Items included in the test relate to (1) active and watching sports, (2) individual and group activities, (3) indoor and outdoor activities. The test also lists a number of items for indicating interest in activities to be enjoyed both in the present and in the distant future.

No method was devised to show closely discriminative degrees of interest in this particular test. The individual was instructed simply to check each item as "like or dislike", and for doing each "frequently, occasionally, or rarely". Indifference was noted by absence of any check for an item. The conclusions from this test are limited.

The Ohio Social Acceptance Test. This test is labeled "Test S A S - I, Advanced Series, Intercultural Testing Program". It is published by the Bureau of Educational Research of Ohio State University. Lists of the names of all students in the groups to be appraised should be prepared for distribution among all of the students so that each student receives a list of her own classmates to check.

The instructions are to mark every name on the list, placing (1) a number 1 before the names of people

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10 Published by the Bureau of Educational Research, Ohio State University, Columbus, Ohio
whom the subject would like as a very best friend, (2) a number 2 before the names of people desirable as good friends, (3) a number 3 before one's own name and before the names of those with whom the subject would just as soon work or play, (4) a number 4 in front of names of persons not known well enough to rate, and lastly, (5) a number 5 before any names of people who are known by the checker but they are not friends and in general are not accepted by the checker.

Clarke\(^{11}\) says that on the basis of results of studies by Tryon and Washburn, athletic ability is an important secondary or contributing factor toward successful personal-social relationships for girls, and skill in physical activities other than the athletic type contribute to social acceptability of boys and girls.

The social acceptance test was used at the beginning and at the end of the year. Results of the two applications of the test show which groups were better adjusted and which groups made the greater degree of improvement.

The information obtained from the initial and final applications of the various measures described in this chapter provide a considerable amount of data. Interpretations of the data follow in Chapter V.

\(^{11}\) Harrison Clarke, *The Application of Measurement to Health and Physical Education*, pp. 281 - 82.
CHAPTER V

RESULTS OF THE EXPERIMENT

For the convenience of the reader, the results of all measures in this experiment have been arranged in tables which form the bulk of this chapter. Findings, in most instances, show both the various means of the groups measured and the critical ratios of the groups compared. The mean alone was used in comparing results of the Progressive Education Association Interest Questionnaire.

Use of the Arithmetic Mean. The arithmetic mean or "average" is the best known measure of central tendency.¹ This measure is calculated from ungrouped measures by the formula: \( M = \frac{\sum x}{n} \), \( M \) stands for mean, \( \sum x \) the sum of the scores, and \( n \) for the number of the scores.² The method for finding the mean in grouped measures for a distribution composed of two or more distributions differing in size is described by Garrett³ as Formula 24. The writer used the first method in determining all means presented in the tables.

² Loc. cit.
³ Ibid. p. 192.
The second method described by Garrett was used as one of the steps in arriving at the critical ratios of the study.

**Use of the critical ratio.** Ross⁴ states that the critical ratio is an accepted common method of comparing groups. This measure is described by Garrett⁵ as the difference of the means divided by the standard deviation of the difference of the means, the formula being \( \frac{\bar{X}_1 - \bar{X}_2}{\sigma_d} \). Glassow and Broer⁶ recommend the use of the critical ratio in measuring the differences between groups.

In order to be significant, the critical ratio should be at least 3.⁷ By way of example, a critical ratio of .068 shows that there is practically no difference between groups whereas a critical ratio of 3.5 shows that the groups compared are unquestionably different in the respect studied.


Steps used in determining the critical ratio are outlined below.

1. Find the changes in scores for each person. This is the difference between the initial and final scores.

2. Make a frequency distribution of the changes.

3. Find the mean of the distribution of the changes. \( M = \frac{\Sigma X}{N} \) (step-interval) + guessed mean.

4. Find the standard deviation or sigma (\( \sigma^- \)) of the distribution of the changes. \( \sigma = \sqrt{\frac{\Sigma X^2 - c^2}{N}} \).

5. Find the difference of the means of the distribution. This is \( M_1 - M_2 \).

6. Find the sigma of the means. See Garrett, p. 208. \( \sigma \) Distribution: \( \sqrt{\frac{\Sigma}{N}} \).

7. Find the sigma of the difference of the means. See Garrett, p. 211. \( \sigma D = \sqrt{\frac{\sigma^2_{M_1}}{n_1} + \frac{\sigma^2_{M_2}}{n_2}} \).

8. The critical ratio, finally, is the difference of the means divided by the sigma of the difference of the means. See Garrett's Table\(^8\), page 213, which shows the significance of such figures.

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\(^8\) Ibid. p. 213.
Along with the tables of means and critical ratios there has been included a table* showing the percentage of improvement in social acceptance. The writer believes this table to show significant meaning.

* Table XVIII.
### TABLE III

**MEAN SCORES OF THE MOTOR EDUCABILITY TEST**

<table>
<thead>
<tr>
<th>Group</th>
<th>Initial Score</th>
<th>Final Score</th>
<th>Score Change</th>
<th>Mean of the Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_1$</td>
<td>9.5</td>
<td>12</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>$P_2$</td>
<td>11</td>
<td>12.6</td>
<td>1.6</td>
<td>1.5</td>
</tr>
<tr>
<td>$C_1$</td>
<td>9</td>
<td>12.6</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>$C_2$</td>
<td>11</td>
<td>13.7</td>
<td>2.7</td>
<td>2.5</td>
</tr>
<tr>
<td>$WC_1$</td>
<td>9.8</td>
<td>11.9</td>
<td>2.1</td>
<td>2.8</td>
</tr>
<tr>
<td>$WC_2$</td>
<td>11.6</td>
<td>14.5</td>
<td>2.9</td>
<td>2.9</td>
</tr>
</tbody>
</table>

The data in Table III shows that no material differences are apparent between any of the groups compared in either the initial or the final motor educability tests. A difference of only two points exists between the score changes (i.e., the differences between the initial and final scores), $P_2$ showing the least improvement, $C_1$ showing the greatest improvement. The means of the changes verify the score change figures.
### TABLE IV

**CRITICAL RATIOS OF THE MOTOR EDUCABILITY TEST**

<table>
<thead>
<tr>
<th>Groups Compared</th>
<th>Critical Ratios</th>
<th>Chances in 100 That Difference is Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₁ with C₁</td>
<td>.51</td>
<td>69</td>
</tr>
<tr>
<td>P₂ with C₂</td>
<td>1.1</td>
<td>36</td>
</tr>
<tr>
<td>W P with W C₁</td>
<td>.057</td>
<td>52</td>
</tr>
<tr>
<td>W P with W C₂</td>
<td>.018</td>
<td>50</td>
</tr>
</tbody>
</table>

Since a critical ratio of 3 denotes statistical difference between groups compared, it is evident by the above table that there is no real significant difference between any of the groups compared. Table IV shows that where whole groups are compared in motor educability, practically no differences appear to be present. Where selected groups are compared, it is noted that difference in motor educability is slightly greater.

A study of the mean scores and of the critical ratios of whole and of selected groups reveals no important differences in motor educability at any time during the study.
**TABLE V**

**MEAN SCORES OF THE VOLLEYBALL KNOWLEDGE TEST**

<table>
<thead>
<tr>
<th>Group</th>
<th>Initial Score</th>
<th>Final Score</th>
<th>Score Change</th>
<th>Mean of the Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_1$</td>
<td>16</td>
<td>33</td>
<td>17</td>
<td>16.84</td>
</tr>
<tr>
<td>$P_2$</td>
<td>17</td>
<td>32.7</td>
<td>15.7</td>
<td>15.05</td>
</tr>
<tr>
<td>$C_1$</td>
<td>20.9</td>
<td>34.5</td>
<td>13.6</td>
<td>13.21</td>
</tr>
<tr>
<td>$C_2$</td>
<td>21.6</td>
<td>32</td>
<td>10.4</td>
<td>10.17</td>
</tr>
<tr>
<td>WP</td>
<td>18.7</td>
<td>33.5</td>
<td>14.8</td>
<td>15.37</td>
</tr>
<tr>
<td>WC1</td>
<td>19</td>
<td>34.7</td>
<td>15.7</td>
<td>15</td>
</tr>
<tr>
<td>WC2</td>
<td>21.9</td>
<td>32.7</td>
<td>10.8</td>
<td>12.1</td>
</tr>
</tbody>
</table>

Initial volleyball knowledge test scores have a range of approximately five points. Final mean scores shown in Table V are superior to the initial mean scores. Group $P_1$ made the greatest improvement, showing a score change of 17; the two lowest mean scores being made respectively by Group $C_2$ and Group $WC_2$. The mean of the changes substantiates this statement.
### TABLE VI

**CRITICAL RATIOS OF THE VOLLEYBALL KNOWLEDGE TEST**

<table>
<thead>
<tr>
<th>Groups Compared</th>
<th>Critical Ratio</th>
<th>Chances in 100 That Difference Is Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_1$ with $C_1$</td>
<td>1.7</td>
<td>96</td>
</tr>
<tr>
<td>$P_2$ with $C_2$</td>
<td>2.03</td>
<td>98</td>
</tr>
<tr>
<td>$W$ $P$ with $W$ $C_1$</td>
<td>0.20</td>
<td>58</td>
</tr>
<tr>
<td>$W$ $P$ with $W$ $C_2$</td>
<td>1.6</td>
<td>94</td>
</tr>
</tbody>
</table>

The most significant critical ratio in Table VI is 2.03 in the comparison of selected groups. The least significant critical ratio is shown in the table to be 0.20 which means that it is a mere guess or "chance" that any difference does exist between the two groups being compared, that is, between Group $W$ $P$ and Group $W$ $C_1$. In three instances it is revealed that some difference does exist between the planning groups and the control groups.

A study of the mean scores and the critical ratios concerning volleyball knowledge shows some near-significant differences between groups.
TABLE VII

MEAN SCORES OF THE VOLLEYBALL SKILL TEST

<table>
<thead>
<tr>
<th>Group</th>
<th>Initial Score</th>
<th>Final Score</th>
<th>Score Change</th>
<th>Mean of the Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₁</td>
<td>44</td>
<td>52</td>
<td>8</td>
<td>7.74</td>
</tr>
<tr>
<td>P₂</td>
<td>41.9</td>
<td>47.3</td>
<td>5.9</td>
<td>5.83</td>
</tr>
<tr>
<td>C₁</td>
<td>51.6</td>
<td>59</td>
<td>7.4</td>
<td>7.21</td>
</tr>
<tr>
<td>C₂</td>
<td>50</td>
<td>56.8</td>
<td>6.8</td>
<td>6.5</td>
</tr>
<tr>
<td>W P</td>
<td>46.5</td>
<td>50</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>W C₁</td>
<td>53</td>
<td>58.3</td>
<td>5.3</td>
<td>5.4</td>
</tr>
<tr>
<td>W C₂</td>
<td>47</td>
<td>57</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

In noting the initial mean scores, shown in Table VII, W C₁ seems to have had the most skill at the beginning of the experiment while P₂ apparently had the least amount. The column showing the final changes in mean scores reveals the greatest range to be 11.2 between groups C₁ and P₂. W C₂ shows the greatest change or improvement in mean scores while W P shows the least improvement. W C₂ and P₁ shows the highest means in the mean of the changes, W P₁ the lowest.
# Table VIII

**Critical Ratios of the Volleyball Skill Test**

<table>
<thead>
<tr>
<th>Groups Compared</th>
<th>Critical Ratios</th>
<th>Chances in 100 That Difference Is Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_1$ with $C_1$</td>
<td>.09</td>
<td>54</td>
</tr>
<tr>
<td>$P_2$ with $C_2$</td>
<td>.12</td>
<td>54</td>
</tr>
<tr>
<td>$WP$ with $WC_1$</td>
<td>.05</td>
<td>52</td>
</tr>
<tr>
<td>$WP$ with $WC_2$</td>
<td>.13</td>
<td>54</td>
</tr>
</tbody>
</table>

Table VIII reveals that there is practically no difference between any of the groups in volleyball skill. Fifty-four chances in one hundred make it a mere guess that any difference exists.
TABLE IX

MEAN SCORES OF THE BASKETBALL KNOWLEDGE TEST

<table>
<thead>
<tr>
<th>Group</th>
<th>Initial Score</th>
<th>Final Score</th>
<th>Score Change</th>
<th>Mean of the Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_1$</td>
<td>15.6</td>
<td>24.2</td>
<td>8.6</td>
<td>8.73</td>
</tr>
<tr>
<td>$P_2$</td>
<td>16</td>
<td>25</td>
<td>9</td>
<td>9.17</td>
</tr>
<tr>
<td>$C_1$</td>
<td>15.7</td>
<td>22</td>
<td>6.3</td>
<td>6.52</td>
</tr>
<tr>
<td>$C_2$</td>
<td>16</td>
<td>20</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>WP</td>
<td>16</td>
<td>25</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>WC$_1$</td>
<td>13.8</td>
<td>21.5</td>
<td>7.7</td>
<td>7.094</td>
</tr>
<tr>
<td>WC$_2$</td>
<td>15</td>
<td>20.7</td>
<td>5.7</td>
<td>8.5</td>
</tr>
</tbody>
</table>

Very little difference between any of the groups is shown by initial scores in Table IX. Final scores show that all groups improved in basketball knowledge. Score changes reveal that groups $P_2$ and WP improved the most while $C_2$ made the least gain. The column for means of the changes in Table IX bears out this statement of gains.
TABLE X

CRITICAL RATIOS OF THE BASKETBALL KNOWLEDGE TEST

<table>
<thead>
<tr>
<th>Groups Compared</th>
<th>Critical Ratios</th>
<th>Chances in 100 That Difference Is Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₁ with C₁</td>
<td>1.2</td>
<td>88</td>
</tr>
<tr>
<td>P₂ with C₂</td>
<td>3.44</td>
<td>99.9</td>
</tr>
<tr>
<td>W P with W C₁</td>
<td>.27</td>
<td>60</td>
</tr>
<tr>
<td>W P with W C₂</td>
<td>.4</td>
<td>65</td>
</tr>
</tbody>
</table>

The critical ratio of 3.44 is truly significant as the figure 99.9 points out in Table X. The critical ratio of 1.2 found in the comparison of P₁ with C₁ is of less importance however it does indicate that there is more difference between these two groups (P₁ and C₁) than between the whole groups compared (W P with W C₁ and W P with W C₂).

Since the mean of P₂ is higher than the mean of C₂ and the mean of the changes is also higher in P₂ the critical ratio 3.44 shows true significant difference and this difference favors the second selected planning group.
### TABLE XI

**MEAN SCORES OF THE BASKETBALL SPEED TEST**

<table>
<thead>
<tr>
<th>Group</th>
<th>Initial Score</th>
<th>Final Score</th>
<th>Score Changes</th>
<th>Mean of the Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_1$</td>
<td>46.8</td>
<td>42.7</td>
<td>-4.1</td>
<td>3.87</td>
</tr>
<tr>
<td>$P_2$</td>
<td>44.6</td>
<td>42</td>
<td>-2.6</td>
<td>2.16</td>
</tr>
<tr>
<td>$C_1$</td>
<td>40</td>
<td>39.6</td>
<td>-4</td>
<td>.71</td>
</tr>
<tr>
<td>$C_2$</td>
<td>42.3</td>
<td>42.8</td>
<td>.5</td>
<td>3.66</td>
</tr>
<tr>
<td>WP</td>
<td>45.6</td>
<td>41.8</td>
<td>-3.8</td>
<td>4.01</td>
</tr>
<tr>
<td>WC$_1$</td>
<td>40</td>
<td>39.5</td>
<td>-.5</td>
<td>.93</td>
</tr>
<tr>
<td>WC$_2$</td>
<td>41.7</td>
<td>42</td>
<td>.3</td>
<td>4.8</td>
</tr>
</tbody>
</table>

Degrees of skill in the initial mean scores vary 6.8 points. Final mean scores reveal the range to be 3.2 points or about half as great as in the initial means. The column of Table XI for score changes shows that in five instances the mean scores are lower in the final test for basketball speed than for the initial test. Group WC$_2$ has the highest mean of the changes, with a mean of 4.8. C$_1$ is shown to have the lowest mean of the changes.
TABLE XII

MEAN SCORES OF THE BASKETBALL ACCURACY TEST

<table>
<thead>
<tr>
<th>Group</th>
<th>Initial Score</th>
<th>Final Score</th>
<th>Score Changes</th>
<th>Mean of the Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₁</td>
<td>4.7</td>
<td>6</td>
<td>1.3</td>
<td>2.2</td>
</tr>
<tr>
<td>P₂</td>
<td>5.1</td>
<td>5.9</td>
<td>0.8</td>
<td>.72</td>
</tr>
<tr>
<td>C₁</td>
<td>6</td>
<td>6.3</td>
<td>0.3</td>
<td>1.45</td>
</tr>
<tr>
<td>C₂</td>
<td>5.9</td>
<td>6.8</td>
<td>0.9</td>
<td>.9</td>
</tr>
<tr>
<td>W P</td>
<td>5.4</td>
<td>6</td>
<td>0.6</td>
<td>.76</td>
</tr>
<tr>
<td>W C₁</td>
<td>5.9</td>
<td>7</td>
<td>1.1</td>
<td>1.18</td>
</tr>
<tr>
<td>W C₂</td>
<td>6.2</td>
<td>6.7</td>
<td>0.5</td>
<td>.24</td>
</tr>
</tbody>
</table>

Table XII shows little difference between any of the groups in the initial mean scores, final mean scores, or mean of the changes. Group P₁ made the greatest change between the initial and the final tests in basketball accuracy as shown by the figure 1.3. The mean score of 2.2, in the column of Table XII showing mean of the changes, is the highest mean. This was made by the planning group, P₁.
\begin{table}
\centering
\begin{tabular}{|l|c|c|}
\hline
Groups Compared & Critical Ratios & Chances in 100 That Difference Is Significant \\
\hline
\(P_1\) with \(C_1\) & 1.8 & 96 \\
\(P_2\) with \(C_2\) & .80 & 79 \\
\(WP\) with \(WC_1\) & 2.05 & 98 \\
\(WP\) with \(WC_2\) & .57 & 71 to 73 \\
\hline
\end{tabular}
\end{table}

Table XIII shows no real differences between any of the groups compared, however, the figure 2.05 does indicate that a certain difference does exist between the whole planning group (\(WP\)) and the whole first control group (\(WC_1\)). The critical ratios of 1.8 and 2.05 show that the planning group made the highest degree of change in speed since the difference of the means as determined in computing these critical ratios* are higher for the planning group than for either control group.

*Table X, Mean of the Changes Column, p. 53.
**TABLE XIV**

**CRITICAL RATIOS OF THE BASKETBALL ACCURACY TEST**

<table>
<thead>
<tr>
<th>Groups Compared</th>
<th>Critical Ratios</th>
<th>Chances in 100 That Difference Is Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₁ with C₁</td>
<td>.75</td>
<td>77</td>
</tr>
<tr>
<td>P₂ with C₂</td>
<td>.72</td>
<td>76</td>
</tr>
<tr>
<td>WP with WC₁</td>
<td>.2</td>
<td>58</td>
</tr>
<tr>
<td>WP with WC₂</td>
<td>.24</td>
<td>58 to 60</td>
</tr>
</tbody>
</table>

Table XIV reveals that there are no significant differences between any of the groups compared, as regards skill in basketball accuracy.
TABLE XV

WOMEN'S ATHLETIC ASSOCIATION MEMBERSHIP

<table>
<thead>
<tr>
<th>Planning Group</th>
<th>First Controlled Group</th>
<th>Second Controlled Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₁</td>
<td>6 Members</td>
<td>C₁</td>
</tr>
<tr>
<td>P₂</td>
<td>7 Members</td>
<td></td>
</tr>
<tr>
<td>W P</td>
<td>10 Members</td>
<td>W C₁</td>
</tr>
</tbody>
</table>

The data presented in Table XV was obtained by a summation of memberships in the Women's Athletic Association.* Although P₁ and P₂ have more members than C₁ and C₂, the W P, W C₁, and W C₂ groups have almost the same number of members. In the writer's opinion this table does not show that one group was interested in physical education, outside of regular class work, any more than another.

* The year in which this experiment was conducted was the first year of organization of the Women's Athletic Association. Entirely different results might have been found had this not been the initial year.
TABLE XVI

RESULTS OF THE SPORTS AND GAMES INTEREST QUESTIONNAIRE

<table>
<thead>
<tr>
<th>Interest Indication</th>
<th>Group</th>
<th>Initial Mean Scores</th>
<th>Final Mean Scores</th>
<th>Differences In Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likes</td>
<td>WP</td>
<td>81</td>
<td>82</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>WC₁</td>
<td>89</td>
<td>95</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>WC₂</td>
<td>73</td>
<td>89</td>
<td>16</td>
</tr>
<tr>
<td>Dislikes</td>
<td>WP</td>
<td>33</td>
<td>30</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>WC₁</td>
<td>27</td>
<td>41</td>
<td>-14</td>
</tr>
<tr>
<td></td>
<td>WC₂</td>
<td>33</td>
<td>40</td>
<td>-7</td>
</tr>
<tr>
<td>Do Frequently</td>
<td>WP</td>
<td>14</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>WC₁</td>
<td>14</td>
<td>22</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>WC₂</td>
<td>20</td>
<td>19</td>
<td>-1</td>
</tr>
<tr>
<td>Do Occasionally</td>
<td>WP</td>
<td>18</td>
<td>23</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>WC₁</td>
<td>25</td>
<td>26</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>WC₂</td>
<td>24</td>
<td>28</td>
<td>4</td>
</tr>
<tr>
<td>Do Rarely</td>
<td>WP</td>
<td>25</td>
<td>34</td>
<td>-9</td>
</tr>
<tr>
<td></td>
<td>WC₁</td>
<td>26</td>
<td>37</td>
<td>-11</td>
</tr>
<tr>
<td></td>
<td>WC₂</td>
<td>30</td>
<td>44</td>
<td>-14</td>
</tr>
</tbody>
</table>

* Whole group comparisons.
TABLE XVII

MEAN SCORES OF THE SOCIAL ACCEPTANCE TESTS *

<table>
<thead>
<tr>
<th>Group</th>
<th>Initial Score</th>
<th>Final Score</th>
<th>Score Change</th>
<th>Mean of the Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₁</td>
<td>94</td>
<td>68</td>
<td>26</td>
<td>26.2</td>
</tr>
<tr>
<td>P₂</td>
<td>93</td>
<td>65</td>
<td>28</td>
<td>28.16</td>
</tr>
<tr>
<td>C₁</td>
<td>43</td>
<td>44</td>
<td>-1</td>
<td>29.6</td>
</tr>
<tr>
<td>C₂</td>
<td>62</td>
<td>63</td>
<td>-1</td>
<td>-0.5</td>
</tr>
<tr>
<td>W P</td>
<td>94</td>
<td>71</td>
<td>23</td>
<td>26.3</td>
</tr>
<tr>
<td>W C₁</td>
<td>45</td>
<td>42</td>
<td>3</td>
<td>1.9</td>
</tr>
<tr>
<td>W C₂</td>
<td>63</td>
<td>59</td>
<td>4</td>
<td>3.4</td>
</tr>
</tbody>
</table>

According to the figures in the initial mean score column of Table XVII, the planning groups did not accept its members as well as did the controlled groups. This is revealed by figures 94, 93, and 94, for the planning groups. Final mean scores for the planning groups, however, are considerably better than the initial scores. In the column showing the means of the differences in mean scores,

* In this test, the lower scores are more desirable than the higher ones.
the planning group shows a difference of 29.6 points
more than the second control group which made the least
improvement of all the groups.
TABLE XVIII

PERCENTAGE OF IMPROVEMENT IN THE SOCIAL ACCEPTANCE TEST

<table>
<thead>
<tr>
<th>Group</th>
<th>Using the Data on Page 59</th>
<th>Percentage of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_1$</td>
<td>$26/94 \times 100$</td>
<td>27.6</td>
</tr>
<tr>
<td>$P_2$</td>
<td>$28/93 \times 100$</td>
<td>30.1</td>
</tr>
<tr>
<td>$C_1$</td>
<td>$-1/43 \times 100$</td>
<td>-2.3</td>
</tr>
<tr>
<td>$C_2$</td>
<td>$-1/62 \times 100$</td>
<td>-1.6</td>
</tr>
<tr>
<td>$W , P$</td>
<td>$23/94 \times 100$</td>
<td>24</td>
</tr>
<tr>
<td>$W , C_1$</td>
<td>$3/45 \times 100$</td>
<td>6.6</td>
</tr>
<tr>
<td>$W , C_2$</td>
<td>$4/63 \times 100$</td>
<td>6.4</td>
</tr>
</tbody>
</table>

The greatest percentage of improvement in social acceptance was made by the planning group in every comparison. The percentage of improvement is noteworthy. In one comparison the difference is shown to be 33.4 points over and above that made in the first selected control group.
No marked differences appear in the mean scores of any of the groups in comparing results of the interest questionnaire. This is true of the initial and final mean scores and of the differences between the means. Wherever a minus score is indicated the difference is meant to be an unfavorable difference, for example, -14 has been written to show that Group W C₁ disliked more activities at the end of the experiment than it did at the beginning. This writer assumes this to be an unfavorable result.

The conclusions made from the results of this study, as shown in this chapter in the tables and interpretations, will be drawn in Chapter VI.
CHAPTER VI

SUMMARY AND CONCLUSIONS

Psychologically, student-teacher planning seems to be an acceptable and commendable practice. Student-teacher views certainly should be more real than those guessed at by instructors.

Observation in this study does not reveal which groups enjoyed activities less or more. Although the instructor had no evidence to support the theory that democratic procedure aids in the development of self-direction and self-expression, observation seemed to bear out this assumption.

Recent studies indicate that cooperative effort is attracting more and more attention. Formerly, student interest was determined largely on the basis of judgment by others, instead of being determined by direct expression by students. The few cases cited earlier in the discussion of cooperative effort are exceptions.

Motor educability. Evidence accumulated by means of statistical analysis of the data regarding motor educability points to no significant differences, at any time in the experiment, among the various groups. Among the whole groups which were compared, chances are even that
no difference existed, the critical ratio being .057 for WP and WC₁ and .018 for WP and WC₂.

Comparisons indicate that the students in the control groups were somewhat superior to those in the planning groups in motor educability. The critical ratios in these two instances are only .51 and 1.1 in favor of the control groups. Statistically significant difference in motor educability therefore is not revealed.

Knowledge. Knowledge growth in every instance, is more apparent in the planning groups. This is true of whole group comparisons, (WP with WC₁ and WP with WC₂), and of the matched group ratios between P₁ and C₁, and P₂ and C₂.

In volleyball knowledge the comparison of matched groups shows greater improvement than does the comparison of whole groups. While none of the ratios indicate statistically significant differences, three of these are large enough to suggest some real differences between the groups compared.

In basketball knowledge, differences which favor the planning group seem to be more marked than in any other comparisons. The planning groups are better than the control groups, even when the whole groups
are considered. The most outstanding difference in the entire study is indicated by the ratio 3.44 favoring the second matched planning group. Differences occur more in comparisons of matched groups than when whole groups are studied.

In view of statistical evidence as regards knowledge, it would seem that the group having a voice in its program planning gains more in knowledge than the group not voicing its expression of wants.

Skill. None of the ratios found in the studies of skill are large enough to indicate statistically significant differences between the groups.

In the comparisons of all groups in volleyball skill, no critical ratio above .13 was found. Results of this study show all groups compared as having similar degrees of volleyball skill.

In interpreting results of basketball skill, two factors are taken into account. These are speed and accuracy. Although speed and accuracy were combined in the testing, the items were measured separately. The matched planning group shows superiority to the first matched control group in both speed and accuracy. Differences noted are important but not statistically significant. The second matched control group shows
slight superiority in both speed and accuracy, however, these differences result in critical ratios of only .80 and .72. For the whole groups, only one comparison indicates real difference between the performance of the pupils who assisted with the planning and those who did not. This comparison yields a critical ratio of 2.05 in favor of the whole planning group for improvement in speed. No significant differences are revealed for changes in accuracy.

No statistically significant differences appear in the comparisons of the whole planning group and the second whole control group as regards speed and accuracy in basketball.

The results of this study indicate that the outcomes from student planning are more favorable for improvement in knowledge than in acquiring skills.

**Interest.** No real difference between any of the groups is perceived in interest as far as extra-curricular sports are concerned.

Of the seventeen women in the matched groups who joined the Women's Athletic Association, thirteen were in the planning groups. When unmatched groups are compared in this respect, no difference is shown between them.
In whole group comparisons of the Sports and Games Interest Questionnaire results, it is found that at the end of the year the control groups apparently like more activities than the planning group but that the planning group dislikes fewer activities finally than does either control group.

The first control group averages reveal that apparently these women enter into certain activities more frequently at the end of the year than they did at the first of the school year, while the planning group and second control group show no appreciable change in this respect.

A greater gain in average is noted in the planning group for activities "occasionally entered into" than for the response to any other part of the 8.3 test. The planning group apparently entered into fewer activities "done rarely" at the end of the experiment than at the beginning, however, all scores on these test items indicate no particular discrimination in this study.

No appreciable differences between the groups or between the beginning and the end of the year for any group are revealed in the amount of interest measured in items of test 8.3.
Social acceptance. Although the control groups appear to have been and to be better adjusted, the planning group in three comparisons made, increased significantly in this respect. Improvement in acceptance of the group increased almost thirty percent more in the matched planning group than in the matched first control group. The matched planning group improved more than thirty-one percent over the matched second control group. Approximately eighteen percent improvement in social acceptance is noted in the whole planning group over and above both control groups. In two cases, the first control and the second control, social acceptance is not quite as high at the end of the study as it was at the beginning.

The planning group made the greatest gains in knowledge and in learning to accept and to be accepted by its fellow classmates more favorably. Although a specific test of interest changes gives no important revelations, it is assumed by the writer that there was actually greater interest in the planning group because there appeared to be more readiness to learn, since knowledge gains were greater.

The writer interprets the results of this study to mean that the cooperative planning group excels in
knowledge and interest, if not in skill development, and that perhaps assistance in planning contributes to improvement in social adaptability.
CHAPTER VII

LIMITATIONS AND SUGGESTIONS FOR FURTHER STUDY

In this study a small number of cases was used. The number of cases available for this study does show results of a sampling nature but a larger number of individuals measured would provide more reliable information.

A study of longer duration might be made.

This thesis presents a report made in only one college, whereas a study similar to this one, conducted in several colleges would show more conclusive evidence regarding the worth of cooperative planning.

This experiment was limited to college freshmen women. Similar studies should prove valuable if planned for women or girls at a different level or for men or boys.

To some extent, facilities limit program and it is difficult to know what results would be if more facilities were available for students in a study such as this one. This suggests that a broader physical education curriculum might be studied in a plan similar to the one used by this writer.
Freshmen attending college have varied high school backgrounds and varied experiences in life. After a year of orientation in the freshman year, an experiment conducted in the sophomore year in the manner described by this writer might show more appreciable results.

In addition to those used in this experiment, the writer suggests the use of a greater number of measuring instruments for determining results of student-teacher planning.
BIBLIOGRAPHY


Evaluation of the Eight-Year Study, Progressive Education Association, University of Chicago, 1940.


Octavec, Frank L., "Grading Student Achievement in Physical Education Activities". Research Quarterly 1:93, Mar., 1931.

Physical Education and Recreation, Book IV, Albany: The University of the State of New York, 1937.


The Eight Year Studies referred to in the footnotes are filed in the Bureau of Educational Research, Ohio State University. These reports are now compiled into the book, *Thirty Schools Tell Their Story*, as listed in this bibliography.
## APPENDIX

### COLLEGE AND UNIVERSITY CATALOG FINDINGS REGARDING FRESHMAN WOMEN IN PHYSICAL EDUCATION CLASSES

<table>
<thead>
<tr>
<th>Institution and Location</th>
<th>Enrollment</th>
<th>Selection or Placement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfred University, Alfred, N. Y.</td>
<td>347</td>
<td>Indefinite</td>
</tr>
<tr>
<td>Brockport Teachers College Brockport, N. Y.</td>
<td>315</td>
<td>Elective</td>
</tr>
<tr>
<td>Cedarville College, Cedarville, Ohio</td>
<td>51</td>
<td>Placement</td>
</tr>
<tr>
<td>Center College, Danville, Ky.</td>
<td>150</td>
<td>Elective</td>
</tr>
<tr>
<td>Cornell College, Mt. Vernon, Iowa</td>
<td>513</td>
<td>Indefinite</td>
</tr>
<tr>
<td>Elmira College, Elmira, N.Y.</td>
<td>314</td>
<td>Elective</td>
</tr>
<tr>
<td>Genesee Teachers College Genesee, N. Y.</td>
<td>350</td>
<td>Indefinite</td>
</tr>
<tr>
<td>Heidelberg College Tiffin, Ohio</td>
<td>250</td>
<td>Indefinite</td>
</tr>
<tr>
<td>Hiram College, Hiram, Ohio</td>
<td>200</td>
<td>Elective</td>
</tr>
<tr>
<td>Hunter College, N.Y. City</td>
<td>13,414</td>
<td>Elective</td>
</tr>
<tr>
<td>Indiana University Bloomington, Ind.</td>
<td>6,935</td>
<td>Elective</td>
</tr>
<tr>
<td>Kansas Wesleyan, Salina, Ks.</td>
<td>125</td>
<td>Elective</td>
</tr>
<tr>
<td>Marietta College Marietta, Ohio</td>
<td>170</td>
<td>Indefinite</td>
</tr>
<tr>
<td>Ohio Northern College, Ada, O.</td>
<td>208</td>
<td>Elective</td>
</tr>
<tr>
<td>Ohio State Univ., Columbus, O.</td>
<td>11,548</td>
<td>Placement</td>
</tr>
<tr>
<td>Plattsburg Teachers College Plattsburg, N. Y.</td>
<td>505</td>
<td>Placement</td>
</tr>
<tr>
<td>Russell Sage College, Troy, N.Y.</td>
<td>627</td>
<td>Placement</td>
</tr>
<tr>
<td>Syracuse Univ., Syracuse, N.Y.</td>
<td>4539</td>
<td>Elective</td>
</tr>
</tbody>
</table>