A COMPARISON OF COMPUTER AND COUNSELOR EFFECTIVENESS IN ASSISTING HIGH SCHOOL STUDENTS EXPLORE AND SELECT COURSES

Thesis for the Degree of Ph. D.

MICHIGAN STATE UNIVERSITY

GARY E. PRICE

1971

This is to certify that the

thesis entitled

A COMPARISON OF COMPUTER AND COUNSELOR EFFECTIVENESS IN ASSISTING HIGH SCHOOL STUDENTS EXPLORE AND SELECT COURSES

presented by

Gary E. Price

has been accepted towards fulfillment
of the requirements for

Ph. D. degree in Education

Richard G. Johnson
Major professor

Date May 3, 1971

O-7639

ABSTRACT

A COMPARISON OF COMPUTER AND COUNSELOR EFFECTIVENESS IN ASSISTING HIGH SCHOOL STUDENTS EXPLORE AND SELECT COURSES

By

Gary E. Price

This study compared the effectiveness of a computer-based counseling system with a human-based counseling system in the specific area of helping students explore and select high school courses. With the growing complexity of courses, prerequisites, and student interests, it is increasingly difficult to provide students with relevant and accurate information as a basis for educational decisions.

During the school year 1970-71, some of the ninth, tenth, and eleventh grade classes of Willowbrook High School, Villa Park, Illinois used the computer to assist in course selection for the following year. For this study, ninety-six students were randomly selected in a manner to include equal numbers from each grade level, from both sexes, and from each achievement quartile and were randomly assigned so as to attain a completely crossed and balanced design with equal numbers assigned

to experimental and control groups. The experimental group used the computer-assisted course selection procedures while the control group was assisted in course selection by counselors in a traditional manner.

Four criterion measures were used to assess the relative effectiveness of the two treatment procedures: a test of students' understanding of information relevant to course selection; students' self-reported reactions to the experience with the computer or counselor; an evaluation of the completed student programs by five counselors who did not know which programs were produced by student-computer interaction and which by student-counselor interaction; and finally, a sum of the weighted course changes requested by students during a two-month period following the initial course selection.

A six-way repeated measures analysis of variance and a four-way completely crossed multivariate analysis of variance were used to test the results. Of major concern was the comparison between computer assisted and counselor assisted course planning, but the effects of subjects' sex, grade level, and ability were also tested as well as all interactions among variables. The interactions were tested to determine if the two scheduling methods might have differential effects associated with the other independent variables.

No differences, based on the four measures, were found between the experimental and control procedures and there were no interaction effects related to treatment and control procedures with any of the other variables. The students scheduled by the computer performed as well across all of the measures as did those students scheduled by the counselor.

A COMPARISON OF COMPUTER AND COUNSELOR EFFECTIVENESS IN ASSISTING HIGH SCHOOL STUDENTS EXPLORE AND SELECT COURSES

By

Gary E. Price

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Counseling, Personnel Services
and Educational Psychology

1971

ACKNOWLEDGMENTS

The writer wishes to express his appreciation to the following individuals:

To Dr. Richard G. Johnson, graduate advisor and chairman of doctoral committee, for his encouragement, advice and availability throughout the doctoral program.

To Miss JoAnn Harris, Director of Guidance at Willowbrook High School, and her staff for providing the resources and assistance to make this study possible.

To Dr. Andrew Porter, committee member, and his staff who assisted me in thinking through my study and gave generously of their time to help in the analysis and interpretation of the data.

To the other members of the doctoral committee, Dr. Norman Bell and Dr. Ray Denny, who were supportative and helpful in setting up and interpreting the results of the study.

To Mrs. Carol Nelson who helped in preparing the final draft of the paper.

To Jan, my wife, who gave me love and constant encouragement and who patiently typed all of the draft

copies for this study. Also, to Elyce and Regina who continued to love me even when I was too busy to be the father I wanted to be.

TABLE OF CONTENTS

Appendix Page

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

RATIONALE

Introduction

A student in high school is asked to make many important decisions regarding the courses he selects. These decisions have a significant effect on his later educational and occupational opportunities. Despite their importance, many of these decisions are made on the basis of inadequate or poorly disseminated information.

Clarke, Gelatt and Levine (1965) pointed out that, "The decision maker needs adequate information, and he needs an effective strategy for analyzing, organizing and synthesizing that information in order to arrive at a choice [p. 41]." Insofar as possible, the high school administration, instructional staff, and, in particular, the counselor, have a responsibility to disseminate accurate, useable and relevant information with which students can make decisions. Clarke, Gelatt and Levine (1965) summarized the demands placed on the counselor when they stated:

> Greater efforts should be made to determine what specific information is relevant to the educational-vocational decision faced by high school students,

> to gather and organize that information, and to help students learn to use it effectively [p. 41].

The information needed for course selection is becoming more and more difficult to keep accessible and up-to-date. The strong movement toward individualized instruction, learning packages, and other educational media makes it very difficult for counselors, teachers, administrators, and students to keep informed regarding course content, course prerequisites and the relationship of a course to other courses in an educational or vocational program. Information that is complete and accurate should be readily available when it is time for students to select courses. Katz (1966) indicated that more information should be included for the decision-making process. Additionally, he pointed out that information given to the student should include the strength(s) or weakness(es) of each alternative. Clarke, Gelatt and Levine (1965) indicated:

> The greater the knowledge the student has concerning the possible sequences of experience that lead from his present situation, the more likely he will be able to direct his development toward the outcomes he desires [p. 46].

How can this information be made available to students faced with course selection decisions?

Some of the problems in the current course exploration and selection procedures consist in the shortage of time that counselors have available on the secondary

level to assist students with accurate and appropriate information for course exploration and selection. It is sometimes difficult to help students select courses that meet their own needs and interests because of the large number of courses that are available to the student. Because of time limitations it is extremely difficult in the current situation for counselors to keep up to date concerning the current curriculum and what is available to students.

The movement toward individualized instruction, and the rapidly changing curriculum designed to keep pace with the knowledge explosion are making course selection increasingly difficult. To effectively assist students in planning their educational programs, counselors need relevant information about students and about curricular offerings. As courses and programs proliferate to meet individual needs, the information demands become greater. It is quite possible that a computer-based system could help students as effectively as counselors by providing as accurate information as counselors provide in the selection of courses. If computers could be as effective as counselors, the computer might be preferred in order to free counselors for other duties.

Purpose

It was the purpose of this study to explore and evaluate the effects of using a computer-based system to assist students in the exploration and selection of courses on the secondary level. The following areas were considered: Were the decisions made by the student regarding course selection in a computer-based system better than those decisions made by the student in a counselor-based system? Did the effectiveness of a computer-based system or a counselor-based system vary according to the student's grade level, the student's ability or the student's sex?

It was the purpose of this study to evaluate the use of a computer-based system to assist students in the exploration and selection of courses in contrast to a counselor-based system. A unique opportunity to evaluate the relative effectiveness of such a computer system was available when Willowbrook High School initiated such a system for three grade levels during the 1970-71 school year.

Rationale

The rationale for studying computer-based course election procedures are related to the following: There is a steady and persistent move to make instruction relevant to the individual. Counselors have a responsibility to provide accurate and current information to assist

students in the decision-making process. Information processing for decision making is becoming more and more difficult for the counselor and student. A good decision is based on interrelated information given in a systematic manner and is made in relationship to one's future plans. Last, effective information dissemination and processing can occur best in a good communication system.

There is a strong movement toward modifying instruction to meet the needs of each student in any given curriculum. Clarke, Gelatt and Levine (1965) indicated that an effort should be made to make accessible necessary information to high school students to assist them in making educational-vocational decisions. The information should then be organized and presented to the student so that it could be used effectively. Cooley (1968) summarized this philosophy when he stated that schools are attempting to change their curriculum to help the individual become a better learner and to make the materials to be learned appropriate to the individual's abilities, interests and needs. The attempt to get the individual to adjust to typical classroom instruction is becoming of less importance. McLuhan and Leonard (1967) pointed out that programed instruction is cutting the time needed for learning certain basic materials by one-half to one-third. This same efficiency could be available if one used a systematic

presentation of materials in helping students learn information needed to make decisions about career plans and courses that they should take.

Learning is becoming more individualized. Students are able to learn faster if information is presented to them in a systematic manner at a level appropriate to their understanding. Information related to educational and vocational decisions could be used more effectively by the individual if it was presented to the student in a systematic manner. The computer-based course exploration and selection system developed for this study (see Appendix A) was programed to interact with the student in a manner so as to present organized information appropriate for the individual when the individual was ready for it.

The counselor along with the administrator and instructional staff has a primary responsibility to disseminate accurate, useable and relevant information to enable students to make better decisions (Clarke, Gelatt, & Levine, 1965). The computer-based system was programed to disseminate current and accurate information appropriate to the individual's ability, interests and achievement.

Efficient information processing is necessary if the student is to make good decisions about courses that are the most appropriate for him. Ehling and Holder

(1966) summarized some of the predicaments the student gets involved in when attempting to make a decision when they stated:

> The students search behavior in the information-decisional system is largely inefficient and wasteful; there is a high degree of uncertainty; he has to build a large communication net to reduce this uncertainty and he is buffeted by much contradictory information from educational 'experts' and nonexperts alike [p. 374].

Kroll (1969) indicated that occupational information dissemination is too large a task for counselors:

> The process of occupational information acquisition, evaluation, storage, retrieval, and dissemination is becoming too complex and time-consuming for the guidance counselor to maintain as an aspect of his activity on the job [p. 3].

Not only is the information dissemination task one of increasing difficulty, but it is also a task often not handled well in counseling. Shostrom and Bramer (1952) stated that, "Probably one of the weakest links in the counseling process is the use of information in the interview [p. 124]."

There are many reasons why information processing is inadequate. McGrail (1967) indicated that too much information is available for a student to sort out when given by a computer. However, the program developed for this study provides small segments of sorted information appropriate for the individual. Cooley (1968) indicated that by allowing students to move toward different objectives or toward the same objective with different

modes of instruction, the information-processing problem becomes more severe. Also, Shostrom and Brammer (1952) suggested "a danger in giving specific information too early or when not solicited by the client [p. 124]." Edwards (1954) stressed the psychological rationale rather than the economic (utility) rationale as a basis for decision making. He indicated that a variable at a given decision point cannot be assigned a given value which is constant for all individuals in all situations. It is important to match information about courses to an individual's aptitudes, achievements, and interests rather than match individual differences in the above areas to constant information. When information is matched to a particular individual it is then possible for a particular variable to assume a degree of importance for that individual in the decision-making process, but a much greater demand is placed upon information-processing capabilities. Clarke, Gelatt and Levine (1965) pointed out that, "The decision maker needs adequate information, and he needs an effective strategy for analyzing, organizing and synthesizing that information in order to arrive at a choice." The computer-based system reported here was programed with pre-organizers, analyzing and summarizing capacities related to the information that was available from the student's record, course prerequisites and the student's future plans.

Pierce (1961) summarized the need for information processing utility with the statement:

> It is clear that no unique information rate can be used to describe the performance of the human being. He can transmit (and, we shall see, respond to or remember) information better under some circumstances than under others. We can best consider him as an information-handling channel or device having certain built-in limitations and properties. He is a very flexible device; he can handle information quite well in a variety of forms, but he handles it best if it is properly uncoded, properly adjusted to his capabilities [p. 234].

The computer-based system was programed to process information so the individual would have the information needed to make an appropriate decision.

There are many considerations related to what is a good decision. Cronbach and Gleser (1957) indicated that most decisions made by students are integrated rather than independent and are likely to be decisions based on much interrelated information. Holder and Ehling (1967) suggested:

> Yet two factors that are critical to the decision-making process are (1) the way a decision-maker obtains information and (2) the constraints which such obtained information imposes on the available alternatives (i.e., how and to what extent uncertainty is reduced relative to available alternatives) [p. 302].

It is important to give students feedback regarding the alternatives they select when making a decision. A general statement related to the probability of a success or failure was given if a student selected a given alternative. For instance, a student in the bottom

quartile of his class would have difficulty in an honors Algebra class. The student could make a much better decision if he knew the chances for success or failure if he selected honors Algebra. Computer-based systems allow one to keep more accurate records of successes and failures and correlate this information to individual's characteristics thereby making probability statements possible. It is important to consider the organization and sequencing of information, the amount of information needed at a given time, and statements regarding possible outcomes if certain decisions are made.

Roberts (1968) presented the following postulates as a basis for a theoretical rationale for information dissemination and processing:

Postulate: 1 Useful information is basic to providing adequate guidance and counseling services.

Postulate: 2 Useful information can only be transmitted accurately through the use of adequate communication systems and processes.

Postulate: 3 Adequate communication systems are free of noise.

Postulate: 4 A reduction of noise in the communicative process will enhance the communication system.

Postulate: 5 Human-machine interaction systems contain only one set of unknown behavior dimensions whereas human-human systems contain two or more unknown sets of behavior dimensions.

Postulate: 6 Human-human interaction systems are extremely complex.

Postulate: 7 Human-machine interaction systems possess the characteristics whereby one set of behavioral dimensions can be controlled [pp. 10-13].

The preceding postulates summarized the theoretical rationale for using a computer-based system to assist in providing accurate, current, concise and complex information to students. A human-machine interaction will allow more control of the information processing systems and will permit one to study the decision-making process and the information that is needed and used by the student to make a given decision.

A summary of the theory related to decision making, information processing and dissemination can be summed up in the following:

1. Disseminated information should be relevant to the receiver of the information.
2. Information should be presented in a sequential pattern if the decisions are going to be made effectively.
3. Specific information should be integrated into the total information processing and decision-making situation.
4. It is important to provide specific up-to-date information if the student is to make a "good" decision.

5. A computer-based system would permit the storage, retrieval, flexibility, and interaction between man and machine that is required for a good decision.

Related Research

There are several computer-based systems functioning in guidance in the area of dissemination. Some of the more recent summaries of the technological aspects of guidance are summarized in Bailey (1970); Havens (1970); Super (1970); Computer-based Vocational Guidance Systems (1969); and Educational Technology (1969).

Of the several computer-based systems that are functioning in some aspect of guidance, some are information storage and retrieval systems (Impellitteri, 1967, 1968). Systems capable of interacting with individual users have been developed for career exploration (Harris, 1968; Impellitteri, 1969; Loughary, et al., 1966; Super, 1968; Tiedeman, 1968), but there has been very little experimental research or development of interactive computer-based systems to assist students in course selection. Many writers have indicated that computers could be effectively used in counseling. Cooley (1964) has indicated that many of the time-consuming details that take large amounts of the counselor's time can now be automated. One of the time-consuming tasks is collecting and distributing accurate

and routine information to enable students to select courses. Roberts (1968) stated that the use of technology in guidance would reduce the workload of counselors in the areas of gathering information, analyzing data and reporting. Further, the processing of data would improve because of clearer and more accurate communication between the counselor and counselee thru the use of technology. Impellitteri (1967) has found that a computer-based system had greater flexibility and storage capacity than counselors and permitted more accurate up-to-date information to be available for the user.

Some concern has been expressed related to the "dehumanizing" process of using man and machine interaction in place of human with human interaction. There is no evidence to suggest that individuals dislike man-machine interaction or that machines cannot do as effective a job as humans. Impellitteri (1968) has summarized the reaction of boys to their interaction with a computerized vocational exploration program. The boys in the experimental group did not indicate that the interaction was any problem. Many boys said they liked the privacy associated with their interaction.

There have been several advantages related to the application of learning principles to a computer-based model in education. Stewart (1967) stated that students

benefited in the following areas when using individualized instructional machines:

> (1) Student reinforcement, (2) Student involvement, (3) Item difficulty control, (4) Speed and pattern of response, (5) Peer pressure reduced, (6) Incomplete task apprehension reduced, (7) Culturally fair items--three dimensional items, (8) Single item exposure, and (9) Consistency of administration [pp. 221-23].

The advantages related to reinforcement, student involvement, individualized speed and pattern of responding, reduction of peer pressure, single-small segments of information and a systematic presentation are present in the computer-based program for course exploration and selection. Harris (1970) further supported the advantages of computer-based programs in her statement that thru the use of computers and good script writing, technology has a positive effect as a part of the counseling program.

> If you define counseling as bringing a group of related facts to bear upon a given situation and thus facilitating a step-by-step decision-making process, computers can perform this function with maximum speed and efficiency. With good script-writing and adequate inter-change between student and computer, computers can add a dimension of student involvement and excitement to self-appraisal, decision-making, vocational exploration, and educational exploration seldom obtained in traditional counseling conferences [p. 163].

Roberts (1968) reached the following conclusions which serve as a basis for using the computer in the guidance program:

> Conclusion: 1 The high-speed computer can be programed to transmit useful information to the counselee in lieu of a counselor.

Conclusion: 2 Useful information can be transmitted accurately, swiftly, and efficiently through the use of a high-speed computer system.

Conclusion: 3 The computer is an adequate system for the facilitation of noise free communication.

Conclusion: 4 Computer generated communication systems possess the advantage of being interrupted less by noise than human communication systems.

Conclusion: 5 Human-machine interaction systems are less complex than human-human systems. The complex nature of human-human systems results in being more vulnerable to noise and serious inhibition of the communicative process.

Conclusion: 6 Communication is enhanced by reducing the complexity of the agents involved in the interaction.

Conclusion: 7 Human-machine systems confront less noise in the communicative process [pp. 10-13].

One of the few studies directly relevant to this research is one by Friesen (1965) in which he compared the similarity of outcomes between the computer-based counseling systems, model counselor, and a second counselor. The criteria included pupil appraisal statements and course selections. "The machine agreed with both human counselors on approximately 75 percent of the appraisal statements and about 65 percent of the course selections." Friesen made three recommendations regarding future studies in computer-based educational exploration: (1) Permit students to explore and select courses that are related to their interests and personality;

(2) Check to determine if students have completed the prerequisites before permitting them to enroll in sequential courses; and (3) Do not permit students to sign up for courses that are not related to the student's achievement and aptitude level. All of the above recommendations were included in this study.

Overview

In Chapter II the research methodology will be considered. This will include a description of the sample and sample selection procedures, a description of the treatments, the hypotheses considered, the experimental design and the statistical analysis. In Chapter III a description of the results of the treatments associated with main effects will be considered. In Chapter IV a summary, discussion of the results and implications of the study will be considered.

CHAPTER II

METHODOLOGY

Introduction

During the 1970-71 school year many of the ninth, tenth, and eleventh grade students at Willowbrook High School, Villa Park, Illinois, used the computer to explore and select courses for the following year. Ninety-six students were randomly chosen in a manner to include equal numbers from each grade level, from both sexes, and from each ability quartile, and were randomly assigned so as to include an equal number of subjects to experimental and control procedures. The experimental group used the computer to assist them in course selection while the control group used the counselor to assist them in the selection of courses in a "traditional" manner.

Four criterion measures were used to assess the relative effectiveness of the computer-based system: test of students' understanding of information relevant to course selection; students' self-reported reaction to their experience with the computer or counselor; evaluation of the completed student programs by five counselors

who did not know which programs were produced by student-computer interaction and which by student-counselor interaction; and finally, a sum of the weighted course changes requested by students during the two-month period following the initial course selection.

A six-way analysis of variance with repeated measures was used to interpret the data. Each measure had a linear transformation performed on it so the scores would be comparable across measures. This transformation permitted a closer examination of the data. Differences between scores were equal across measures. For instance, a two point difference on one measure equaled the same amount of difference on another measure. This transformation was helpful because the raw scores from the measures used in this study were not comparable. The new score from the linear transformation was formed by dividing each original score on a given measure by the square-root of the mean square error (the with-in variance) for that measure. A four-way completely crossed multivariate analysis of variance was used to analyze the data. The repeated measures analysis was used to test the hypothesis. Also, the results from the multivariate analysis were reported. This permitted the investigator to interpret the data from at least two different statistical analyses. Of major concern was the comparison between computer-assisted and counselor-assisted course planning,

but the effects of subjects' sex, grade level, and ability were also tested as well as all interactions among all variables.

Population

Willowbrook High School is a suburban, comprehensive high school located 15 miles west of Chicago, with approximately 3,400 students. After high school, 45% of its students attend four-year colleges; 20% attend the local community college; 25% go directly into jobs without further training; and approximately 10% attend technical and specialized schools.

Sample

The 1970-71 freshman, sophomore, and junior classes were divided into ability quartiles based on their composite grade equivalent score on the SDS Educational Development Series battery. The battery composite is based on eight subscales (non-verbal, verbal, reading, English, math, science, the United States of America, and solving everyday problems) in four tested areas (Abilities, Language Studies, Technical Studies and Social Studies). Table 2.1 gives the quartile breakdown by grade and grade equivalent.

From each quartile in each of the three grade levels, two boys and two girls were randomly selected and assigned to each of the two course-selection

TABLE 2.1

Grade Equivalent Ranges by Quartiles and Grades

Ability Quartile	Class of '72 Juniors	Class of '73 Sophomores	Class of '74 Freshmen
1st	below 9.8	below 7.7	below 8.2
2nd	9.9 - 10.6	7.8 - 8.5	8.3 - 8.8
3rd	10.7 - 11.2	8.6 - 9.5	8.9 - 9.4
4th	11.3 and above	9.6 and above	9.5 and above

procedures. The results were a 2 x 3 x 4 x 2 x 4 completely crossed and balanced design. Thus, there are two treatment groups, three grade levels, four quartiles within each grade level, two sexes within each quartile and four measures. The experimental design is illustrated for all variables in Table 2.2.

All of the students in the sample were "computer-wise" due to their experience with vocational exploration scripts. Each counselor has an IBM 2260 display terminal in his office. It is used on a regular basis during counseling sessions to recall a student's records or explore vocational information with the student. There are also terminals independent of the counselor for the student to use on an individual basis.

Measures

Four measures were taken to evaluate the relative effectiveness of the course exploration and selection procedures.

Table 2.2

Experimental Design

N = 96

Independent Variables				Dependent Variables			
Treatment	Grade Level	Quartile	Sex	Counselors' Ratings	Information Test	Weighted Course Changes	Students' Reaction
Experimental	Freshmen	1	M				
			F				
		2	M				
			F				
		3	M				
			F				
		4	M				
			F				
	Sophomores	1	M				
			F				
		2	M				
			F				
		3	M				
			F				
		4	M				
			F				
	Juniors	1	M				
			F				
		2	M				
			F				
		3	M				
			F				
		4	M				
			F				
Control	Freshmen	1	M				
			F				
		2	M				
			F				
		3	M				
			F				
		4	M				
			F				
	Sophomores	1	M				
			F				
		2	M				
			F				
		3	M				
			F				
		4	M				
			F				
	Juniors	1	M				
			F				
		2	M				
			F				
		3	M				
			F				
		4	M				
			F				

1. Information Test

   Immediately after the scheduling interview with the counselor or computer, each student was given a test to assess his knowledge of information relevant to making course selections. The test (see Appendix B) contained items to assess the student's knowledge of curricular offerings, prerequisites, college requirements, etc. This test had a Kuder Richardson #20 reliability of .7463 and a standard error of measurement equal to 1.7982 based on the first trial administration to thirty students. Revisions were made, based on the first administration, to have a more reliable instrument for use in the study. The revised Information Test had a Kuder Richardson #20 reliability of .7609 and a standard error of measurement equal to 1.9607 when administered to the ninety-six students taking the test in this study.

2. Student Reaction Questionnaire

   Immediately after the scheduling interview with the counselor or computer, each student was asked to report his reaction to the interview. The questionnaire (see Appendix C) asked students to indicate their degree of

satisfaction with the courses selected, with the information provided, and with the way in which information was presented. This questionnaire had a Hoyt reliability of .8395 and a standard error of measurement equal to 4.3638 based on the first trial administration to thirty students. Revisions were made to have a more reliable instrument for use in the study. The revised questionnaire had a Hoyt reliability of .8504 and a standard error of measurement equal to 3.7363 based on the ninety-six students taking the test in this study.

3. Counselor's Ratings of Course Selections
   Twelve counselors from Willowbrook High School served as a pool of counselors from which five were randomly selected to independently rate the appropriateness of the course selections for the ninety-six students without knowing the identity of the students and without knowing whether the selections were counselor-student or computer-student produced. The counselors did not receive any training to do the ratings as a part of this study. The raters were given aptitude, achievement, interest, and career plan data

on each student. Based on these four student characteristics, the raters indicated the appropriateness of the course selections on a five-point scale (see the Instructions to the Counselor and the Student Summary Sheet in Appendix D). Each student summary sheet was randomly assigned to five different groups. Each student's course selection was rated by five different counselors from the pool of twelve counselors. Each rater had an equal number from each grade level and an equal number of computer-scheduled and counselor-scheduled students to rate. A Hoyt reliability was calculated for all of the ratings on all of the students. A reliability of .6615 and a standard error of measurement of 2.4033 was found for the sum of counselor ratings. The sum of the ratings for each student was used as a dependent variable in the study.

4. Changes in Course Selections

Changes in elected courses can occur for various reasons. Students can make course changes because their interests change, they decide a course is too difficult, they do not complete the necessary prerequisites to take

the course(s) elected, and/or they are not permitted to take a course because they have inadequate aptitude for that course. It was decided that not all course changes were equal in degree of change and did not equally reflect ineffective and/or effective counseling. A system of weighting course changes was devised for this study. Table 2.3 gives the matrix for the assignment of weights to course changes. The weights were assigned according to the following criterion: A change of a course within a department was assigned a weight of 1, 3, or 5 depending on whether the change was made because of a change in interest, a lack of aptitude or a lack of the necessary prerequisites, respectively. A change of a course between departments was given a weight of 2, 4, or 6 depending on whether the change was made because of a change in interest, a lack of aptitude or a lack of the necessary prerequisites, respectively. The course changes were evaluated from the initial time of course selection until April 1, 1971.

TABLE 2.3

Assignment of Weights to Course Changes

Change in course election because of:	Within department changes	Between department changes
Change in interest	1	2
Lack of aptitude	3	4
Lack of prerequisites	5	6

Treatments

As previously indicated, each subject was randomly assigned to one of the following two course selection procedures in a manner to insure equal cell frequency:

1. Computer-Assisted Course Selection

   During the first week of February 1971 the students were given a registration guide for them to read before the scheduling interview. The students were then sent a note which indicated that it was time for them to register for their courses for the 1971-72 school year. The students then made an appointment to be scheduled with the assistance of the computer. A computer program developed by the initiator of this study and the staff of Willowbrook High School allowed students to interact with the computer to select courses for the following year. The program helped the students consider the curricular alternatives in light of their interests, abilities, and previous

course work. Procedures were developed which allowed each student to interact with the program through a visual display terminal. The interaction time was about twenty minutes. Selection of courses for these students was made without the consultation of a counselor although counselors were available subsequently if the need occurred. None of the students requested a counselor's assistance during the interview. After the student selected his courses the secretary checked the student's name against a list to determine if he was in the study. If he was in the study, he was then given the Information Test and the Reaction Questionnaire related to his scheduling interview. No mention was made to the student that this was a part of an experimental study. It was indicated to the student that this was a part of the ongoing evaluation at Willowbrook. (See Appendix E for a script of a computer-based scheduling session.)

2. Counselor-Assisted Course Selection

Students in this group selected courses in consultation with a counselor in the manner traditionally used at Willowbrook and in many other high schools. The students did not

receive computer assistance. During the first week of February 1971 the students were given a registration guide for them to read before the scheduling interview. The students were then sent a note which indicated that it was time for them to register for their courses for the 1971-72 school year. The students then made an appointment to see their counselor to select their courses. The counselors who assisted in scheduling students did not know which students were in the study and which were not. The student, in an individual interview, talked over his career plans, his academic progress, and his performance on tests he had taken that were assumed to be related to his interests and future plans. This discussion served as the basis for course selection. After the student selected the courses, the course numbers were entered for each student on a computer terminal by the counselor and the student was requested to go to the secretary and pick up a copy of his course selections for the following school year. The counselor spent about twenty-five to thirty minutes with each student. At this time the secretary checked the student's

name against a list to determine if he was in the study. If he was in the study, he was then given the Information Test and the Reaction Questionnaire related to his scheduling interview. No mention was made to the student that this was a part of an experimental study. It was indicated to the student that this was a part of the ongoing evaluation at Willowbrook.

Hypotheses

All hypotheses are stated in the null form because there is no direct a priori evidence to suggest that the results of the study would be significant in a given direction suggesting research or alternative hypotheses.

1. No differences exist between the treatments (counselor-scheduled students and the computer-scheduled students) as measured by the counselor's ratings, information test, student's reaction questionnaire and the weighted course changes.
2. No differences exist among the three grade levels as measured by each of the four measures.
3. No differences exist among the four quartiles as measured by each of the four measures.

4. No differences exist between males and females as measured by each of the four measures.

Thus, in summary, no differences exist between those students scheduled by the computer and those students scheduled by the counselor on each of the following measures: (1) Counselor ratings; (2) Amount of information remembered by the student after scheduling interview; (3) Student reaction to scheduling interview; and (4) The kind of changes in course elections between scheduling interview and April 1, 1971.

The design and analysis allowed tests of all interaction effects associated with grade level, quartile and sex of the student. All hypotheses related to interaction effects will be reported in Chapter III.

The effects of each independent variable and all interactions among them will be tested as null hypotheses.

It was most important to know if the experimental group would be different than the control group on the four dependent variables.

Analysis

The data obtained from the four measures was analyzed using a 2 x 3 x 4 x 2 x 2 x 4 repeated measures analysis of variance (ANOVA) in which grade level, ability level, sex, treatment, subjects and measures are the independent variables.

Also, a multivariate analysis of variance (MANOVA) was used to interpret the data.

ANOVA analyzed the data by level on all variables and then did a separate analysis by configuration or interaction effects on all variables. This analysis permitted one to know the degree of relationship between the measures and the other variables. One can also determine if one measure is more effective than another measure in accounting for difference(s) between variables. The Jennrich analysis of variance program was used to analyze the data (Jennrich, 1961).

MANOVA analyzed the data by combining level and configuration for all of the measures on all of the variables. The Finn Multivariate analysis of variance program was used to analyze the data (Finn, 1970).

CHAPTER III

RESULTS

The results of the study are summarized in this chapter. Each of the null hypotheses is presented. An alpha level of .05 was selected to test the statistical significance of each hypothesis. A 2 x 3 x 4 x 2 x 2 x 4 data matrix was constructed for the tests of the hypotheses. The data was analyzed using repeated measures analysis of variance and a multivariate analysis of variance. The repeated measures analysis used separate tests for main effects and interaction effects. The multivariate analysis combined the tests for main effects and interaction effects. The multivariate analysis also incorporated a univariate test for each measure and a step down F-test. This permitted a closer inspection of the data so that one could see to what degree each measure was contributing to the overall effect. The cell means by treatment, grade level, quartile and sex for each of the four dependent variables are presented in Table 3.1.

Table 3.2 summarizes the results of the repeated measures analysis of variance. It will be referred to as

Table 3.1

Cell Means from Raw Data for Treatment, Grade Level, Quartile and Sex on Each Measure

Independent Variables				Dependent Variables			
Treatment	Grade Level	Quartile	Sex	Counselors' Ratings	Information Test	Weighted Course Changes	Students' Reaction
Experimental	Freshmen	1	M	15.5	15.0	0	89.0
			F	14.0	19.0	0	86.0
		2	M	10.0	17.0	0	78.5
			F	15.5	17.0	2	93.0
		3	M	19.5	15.0	0	100.0
			F	16.0	16.0	0	93.0
		4	M	14.5	22.5	.5	81.0
			F	21.0	21.0	.5	83.5
	Sophomores	1	M	13.5	17.5	3.5	97.0
			F	19.0	18.5	0	98.0
		2	M	12.0	21.5	2.5	85.5
			F	19.5	19.5	.5	93.0
		3	M	18.0	21.0	0	91.5
			F	13.5	18.0	0	87.0
		4	M	20.5	23.0	.5	102.0
			F	19.5	23.0	0	89.0
	Juniors	1	M	12.5	16.5	.5	89.5
			F	15.0	16.0	1	97.5
		2	M	13.0	17.0	1	88.5
			F	14.0	21.5	.5	84.5
		3	M	17.0	21.5	.5	78.5
			F	19.5	20.5	.5	81.5
		4	M	22.5	20.5	0	81.5
			F	23.0	22.0	0	82.0
Control	Freshmen	1	M	16.0	14.5	0	90.5
			F	21.0	12.5	0	82.0
		2	M	17.5	13.5	0	81.0
			F	11.5	20.0	3	96.5
		3	M	22.0	16.0	1.5	91.5
			F	19.0	21.5	0	94.0
		4	M	23.5	17.0	0	93.0
			F	16.0	21.0	.5	93.5
	Sophomores	1	M	17.5	15.5	.5	86.5
			F	17.5	22.5	0	88.5
		2	M	15.5	20.0	0	85.0
			F	19.5	18.5	0	92.0
		3	M	13.0	19.5	0	95.0
			F	19.5	19.0	0	88.0
		4	M	23.0	23.5	.5	97.0
			F	16.0	20.5	.5	81.0
	Juniors	1	M	8.0	14.0	.5	89.0
			F	20.0	20.0	.5	89.0
		2	M	17.0	17.5	0	93.5
			F	18.5	21.5	1	91.5
		3	M	16.5	23.0	0	83.5
			F	20.0	21.0	.5	97.5
		4	M	10.0	19.0	0	89.0
			F	19.0	23.5	.5	98.0

Table 3.2

Repeated Measures Analysis of Variance Table for Transformed Scores*

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F
Treatment (T)	0.048	1	0.0476	.0498
Grade (G)	3.695	2	1.8475	1.9326
Quartile (Q)	8.526	3	2.8418	2.9728**
Sex (S)	4.026	1	4.0263	4.2119**
Measures (M)	2828.017	3	942.6723	922.7700**
T X G	3.466	2	1.7329	1.8128
T X Q	2.849	3	0.9497	.9935
T X S	2.039	1	2.0392	2.1332
G X Q	7.177	6	1.1961	1.2512
G X S	8.800	2	4.4000	4.6029**
Q X S	5.061	3	1.6868	1.7646
T X M	2.259	3	0.7530	.7371
G X M	6.516	6	1.0859	1.0630
Q X M	28.394	9	3.1549	3.0883**
M X S	3.044	3	1.0146	.9931
T X G X Q	1.173	6	0.1954	.2044
T X G X S	2.244	2	1.1220	1.1737
T X Q X S	0.781	3	0.2604	.2725
G X Q X S	8.588	6	1.4313	1.4973
T X G X M	6.798	6	1.1330	1.1090
T X Q X M	9.335	9	1.0371	1.0152
G X Q X M	14.441	18	0.8022	.7853
T X S X M	1.973	3	0.6576	.6437
G X S X M	7.891	6	1.3152	1.2874
Q X S X M	6.698	9	0.7442	.7285
T X G X Q X S	2.493	6	0.4154	.4345
T X G X Q X M	15.096	18	0.8386	.8209
T X G X S X M	5.779	6	0.9631	.9428
T X Q X S X M	8.883	9	0.9870	.9662
G X Q X S X M	22.317	18	1.2398	1.2136
T X G X Q X S X M	18.131	18	1.0072	.9860
R:TGQS	45.884	48	0.9559	
MR:TGQS	147.106	144	1.0215	
Total	3239.529	383	8.4582	

*See page 18 for explanation of the linear transformation.

**$\alpha = .05$

each hypothesis is restated and tested. The findings from each of the analysis procedures will be reported. The mean for each measure and the overall mean for all of the measures will be given in tabled form for each variable of interest as each hypothesis is tested.

Hypothesis 1

The first hypothesis in this study states that no differences will exist between the control group (counselor scheduled students) and the experimental group (computer scheduled students) on the dependent variables of counselor's ratings, information test, student's reaction and the weighted course changes.

Results

The overall mean and the mean for each of the measures for both groups is summarized in Table 3.3.

TABLE 3.3

Treatment Means for Each Measure

Using Transformed Scores*

	Counselors' Rating	Information Test	Weighted Course Changes	Students' Reaction	Overall Mean
Control (Counselor Scheduled)	4.38	4.83	.39	8.20	4.45**
Experimental (Computer Scheduled)	4.18	4.88	.58	8.07	4.43**

*See page 18 for explanation of the linear transformation.

**Differences among means not significant, $\alpha = .05$, see page 34.

The main effect of treatment was not statistically significant at $\alpha = .05$ ($F = .0498$, d.f. 1,48) and the treatment by measure interaction effect was not significant at $\alpha = .05$ ($F = .7371$, d.f. 3,144) based on the repeated measures analysis of variance. The multivariate test of equal mean vectors supported that the effect due to treatment was not statistically significant ($\alpha < .7740$). Thus, the statistical analysis across all of the measures failed to reject Hypothesis 1. The counselor scheduled students did no better than the computer scheduled students. Also, one should note that the actual difference in the overall mean was very small, two-hundredths of a point, thus, suggesting that a Type II error (failing to reject the null hypothesis when it should be rejected) is unlikely to have occurred.

Hypothesis 2

The second hypothesis states that no differences exist among the three grade levels on each of the four measures.

Results

The overall mean and the mean for each of the measures for each of the three grade levels is summarized in Table 3.4.

The effect due to grade level was not statistically significant at $\alpha = .05$ ($F = 1.9326$, d.f. 2,48) and

TABLE 3.4

Grade Level Means for Each Measure

Using Transformed Scores*

	Counselors' Ratings	Information Test	Weighted Course Changes	Students' Reaction	Overall Mean
Freshmen	4.29	4.44	.50	8.10	4.33**
Sophomores	4.37	5.11	.53	8.27	4.57**
Juniors	4.18	5.02	.44	8.03	4.42**

*See page 18 for explanation of the linear transformation.

**Differences among means not significant, $\alpha = .05$, see page 34.

the grade level by measure interaction effect was not significant at $\alpha = .05$ ($F = 1.0630$, d.f. 6,144) based on the repeated measures analysis of variance. Also, the effect due to grade level was not statistically significant ($\alpha < .3032$) based on a multivariate test of equality of mean vectors. The multivariate test failed to reject Hypothesis 2 although the univariate F for the Information Test was statistically significant ($\alpha < .0193$). A step down F-test was used to investigate whether or not the Information Test was able to distinguish between grade levels in a manner unique from that of the other measures. In the step down F-test procedure, an F-test is applied to the first ordered dependent variable and so on for each dependent variable. All of the variance of a variable not accounted for by the previous F-tests

on each of the preceding dependent variables is used as a basis for the F-test of that variable. When an F-test on a dependent variable ordered last is found to be significant this indicates that that variable is discriminating between levels of the independent variable in a way different and unlike any of the other variables. The F-test applied to each of the succeeding order of variables is referred to as a step down F-test (Whitla, 1968). The Information Test had a step down F significant ($\alpha < .0203$) when ordered last by the multivariate program. One would expect a positive relationship between grade level and scores on an information test about course offerings. Inspection of the means in Table 3.4 suggests that the grade effect on the Information Test was due to Freshmen being lower than both Sophomores and Juniors who were about equal.

Hypothesis 3

The third hypothesis states that no differences exist among the four ability quartiles on the four measures.

Results

The overall mean and the mean for each of the measures for each quartile is presented in Table 3.5.

The effect due to quartile was statistically significant at $\alpha = .05$ ($F = 2.9728$, d.f. 3,48) based on

TABLE 3.5

Means for Each of the Measures for Subjects Grouped by Ability Quartiles Using Transformed Scores*

	Counselors' Ratings	Information Test	Weighted Course Changes	Students' Reaction	Overall Mean
$Quartile_1$	3.98	4.28	.54	8.20	4.25**
$Quartile_2$	3.86	4.77	.87	8.05	4.39**
$Quartile_3$	4.49	4.93	.25	8.19	4.47**
$Quartile_4$	4.80	5.45	.29	8.11	4.66**

*See page 18 for explanation of the linear transformation.

**Difference among means significant, $\alpha = .05$, see page 34.

the repeated measures analysis of variance. The mean increased as the quartile of the students increased. Also, a significant ($\alpha = .05$) interaction effect was found between quartile and measures ($F = 3.0883$, d.f. 9,144) based on the repeated measures analysis of variance. The interaction is illustrated in Figure 3.1. The counselors rated the course elections as equally appropriate for those students in ability quartiles one and two and rated those students' elections in quartiles three and four as more appropriate than the first and second quartile students' elections.

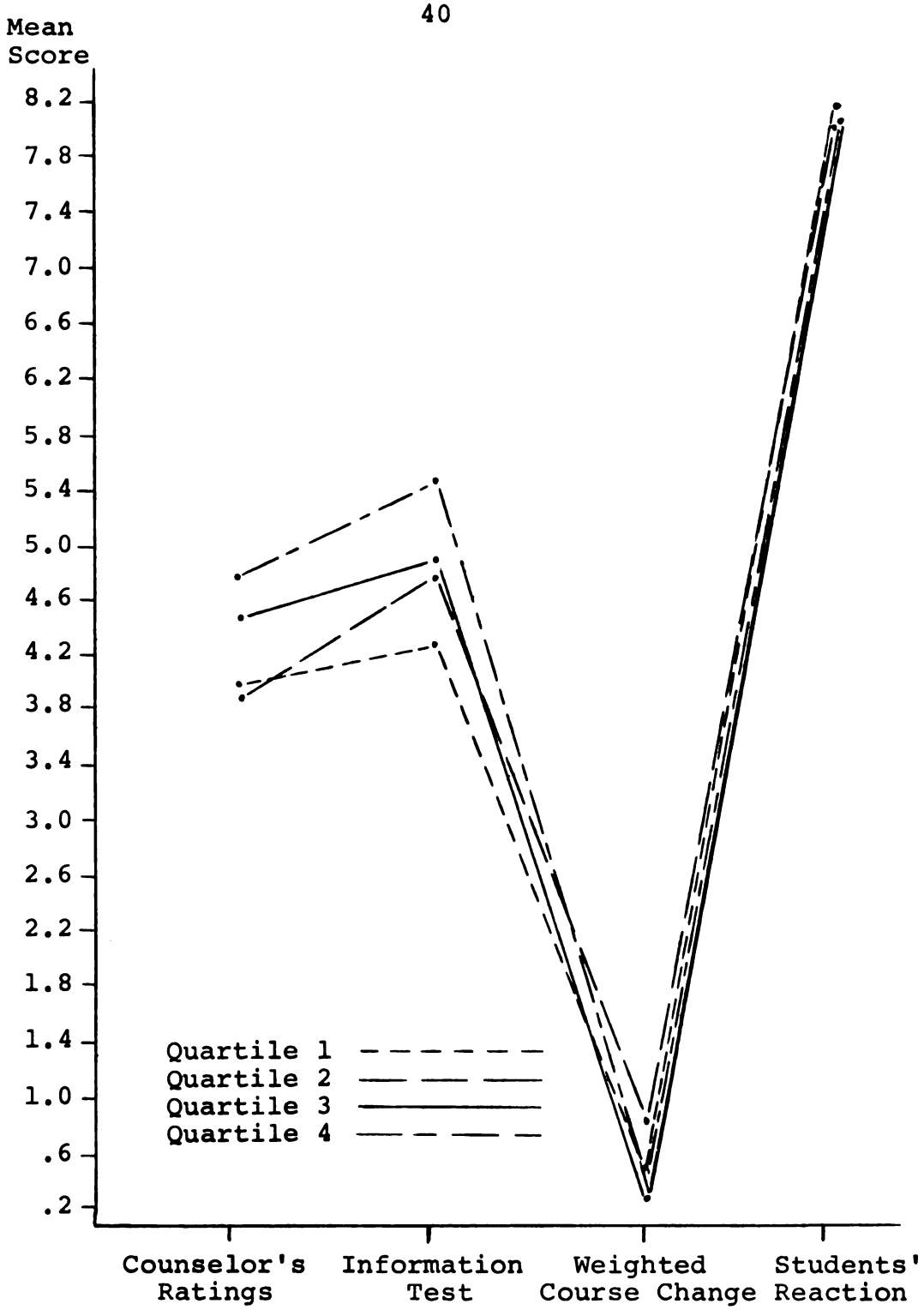

FIGURE 3.1

Quartile and Measure Interaction Overall Measure Using Transformed Scores*

*See page 18 for explanation of transformation. Significant difference, $\alpha = .05$, see page 34.

There was a direct relationship between the student's quartile and his performance on the Information Test. The higher the student's quartile the better he performed on the Information Test.

There was not a relationship between the student's quartile and the number and kind of course(s) the student changed. The students in the lower quartiles changed courses as much as students in the upper quartiles.

The difference between the students reaction to the course selection experience was very small. The students in the lower quartiles had as favorable experience in selecting courses as did the students in the upper quartiles.

The differences among quartiles based on the multivariate test of mean vectors was statistically significant ($\alpha < .0106$). The univariate test of significance for the Counselor Ratings was statistically significant ($\alpha < .0062$). The univariate test of significance for the Information Test was statistically significant ($\alpha < .0024$). The univariate test of significance on the Students' Reaction Questionnaire was not statistically significant ($\alpha < .9468$). Each of the variables was reordered. A step down F-test was applied. The step down F-test for the Information Test was statistically significant ($\alpha < .0177$) when ordered last. The step down F-test for Counselors' Ratings was not

statistically significant ($\alpha < .0663$) when ordered last. The step down F-test for weighted course changes was not statistically significant ($\alpha < .4220$) when ordered last. The step down F-test for the Students' Reaction was not significant ($\alpha < .8855$) when ordered last. The above tests indicate that the Information Test was able to account for the variance between quartiles in a manner quite unlike any of the other variables.

Hypothesis 4

The fourth hypothesis states that there would be no differences between males and females on the four measures.

Results

The overall mean and the mean for each of the measures for males and females is presented in Table 3.6.

TABLE 3.6

Male and Female Means on Each of the Measures Using Transformed Scores*

	Counselors' Ratings	Information Test	Weighted Course Changes	Students' Reaction	Overall Mean
Males	4.08	4.68	.50	8.09	4.34**
Females	4.49	5.03	.48	8.18	4.55**

*See page 18 for explanation of the linear transformation.

**Difference between means significant, $\alpha = .05$, see page 34.

The difference between the performances of the females and the males over all of the measures was statistically significant at $\alpha = .05$ ($F = 4.2119$, d.f. 1,48) and the interaction effect between sex and measure was not significant at $\alpha = .05$ ($F = .9931$, d.f. 3,144) based on the repeated measures analysis of variance. Girls performed at a higher level on three of the measures than did the males. The multivariate analysis did not find a significant difference ($\alpha < .2020$) between males and females. The inconsistency between the repeated measures analysis and the multivariate analysis could result from the following: The repeated measures analysis tested only for differences between levels of the two variables whereas the multivariate analysis tested for level and configuration or interaction simultaneously. Thus, because of the low but consistent difference between sexes in favor of the girls, the repeated measures analysis was able to find differences between the performance of the males and the performance of the females.

All of the possible interactions of treatment, grade, quartile, sex, subject and measures were tested. An interaction effect between grade level and sex was found to be statistically significant at $\alpha = .05$ ($F = 4.6029$, d.f. 2,48) based on the repeated measures analysis of variance. The interaction effect among grade level, sex, and measure was not significant based on the repeated

measures analysis. The multivariate analysis of variance also found the interaction significant ($\alpha < .0346$). The means of the males and females are represented as points on the graph to illustrate the grade by sex interaction (Figure 3.2). The Freshmen and Junior females had higher overall means than did the males. The females continued to increase their overall mean from the Sophomore year to the Junior year, but the males decreased their mean from the Sophomore year to the Junior year which contributed to the interaction.

The measures of the weighted course changes found the following: There was no significant difference between

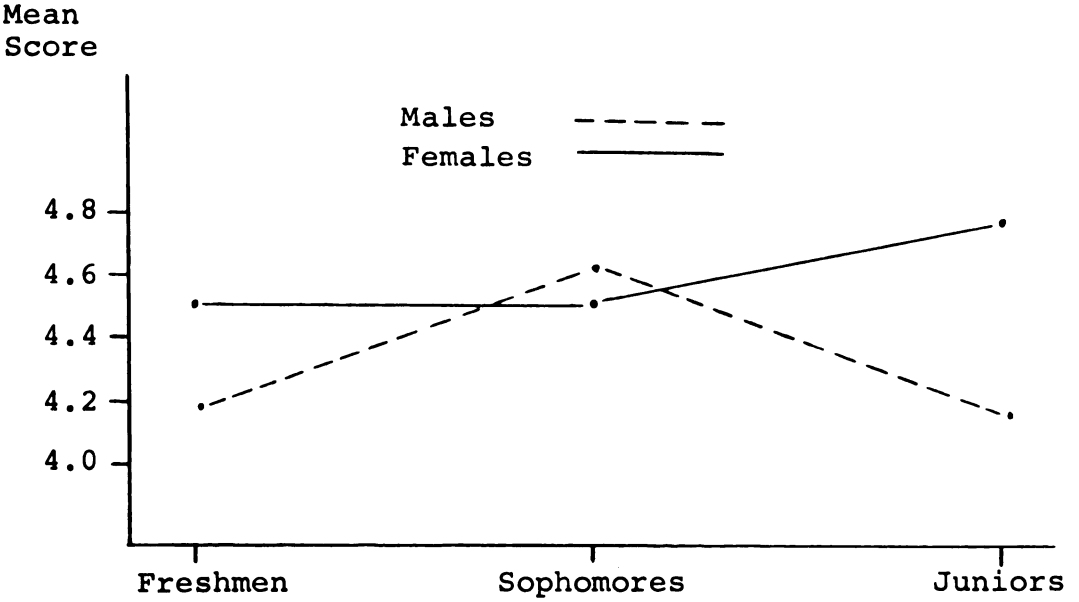

FIGURE 3.2

Grade X Sex Interaction Overall Measures

Using Transformed Scores*

*See page 18 for explanation of the linear transformation.

Statistically significant, $\alpha = .05$, see page 34.

the treatment and control group. Of the ninety-six students in the study sixty-eight or 70.83% of the students did not make any changes in their courses. Twenty-two of the ninety-six students made changes because of an interest change and only six of the ninety-six students had to change their schedules because their ability was not appropriate for the courses elected or they had not completed the necessary prerequisites. (Probably more changes will continue to be made and a better comparison between the treatment methods could be made after the start of the 1971-72 school year.)

Summary

This chapter presented the results from the data analysis based on a repeated measures analysis of variance and a multivariate analysis of the design. Each hypothesis was restated along with an appropriate description of the data. A summary of the hypotheses follows:

Hypothesis 1 was not rejected. It stated:

No differences exist between the mean of the control group (counselor-scheduled students) and the experimental group (computer-scheduled students) as measured by each of the four measures.

Hypothesis 2 was not rejected. It stated:

No differences exist among the means of the three grade levels as measured by each of the four measures.

Hypothesis 3 was rejected. It stated:

No differences exist among the means of the four quartiles as measured by each of the four measures.

Hypothesis 4 was rejected. It stated:

No differences exist between the mean of the males and the mean of the females as measured by each of the four measures.

A statistically significant interaction effect was found across all measures between grade and sex. The interaction effect occurred at the Junior level where the females' mean increased over the mean for the Sophomore females and the Junior males' mean decreased below the Sophomore males' mean. The Freshmen and Junior females' mean was higher than the Freshmen and Junior males' mean. The Sophomore males had a slightly higher mean than did the Sophomore females. This difference also contributed to the interaction.

A significant interaction effect was found between quartiles and measures. The interaction was caused because the upper quartile students were not consistently higher than the lower quartile students on all measures. The upper quartile students' course elections were rated higher than the lower quartile students' elections. The lower quartile students had a higher average weight for their course changes than did the upper quartile students.

Also, the upper quartile students did better on the Information Test than did the lower quartile students.

CHAPTER IV

SUMMARY, DISCUSSION, AND IMPLICATIONS

Summary

This study compared the effectiveness of a computer-based counseling system with a human-based counseling system in the specific area of helping students explore and select high school courses. With the growing complexity of courses, prerequisites, and student interests, it is increasingly difficult to provide students with relevant and accurate information as a basis for educational decisions.

During the school year 1970-71, some of the ninth, tenth, and eleventh grade classes of Willowbrook High School, Villa Park, Illinois used the computer to assist in course selection for the following year. For this study, ninety-six students were randomly selected in a manner to include equal numbers from each grade level, from both sexes, and from each achievement quartile and were randomly assigned so as to attain a completely crossed and balanced design with equal numbers assigned to experimental and control groups. The experimental group

used the computer-assisted course selection procedures while the control group was assisted in course selection by counselors in a traditional manner.

Four criterion measures were used to assess the relative effectiveness of the two treatment procedures: a test of students' understanding of information relevant to course selection; students' self-reported reactions to the experience with the computer or counselor; an evaluation of the completed student programs by five counselors who did not know which programs were produced by student-computer interaction and which by student-counselor interaction; and finally, a sum of the weighted course changes requested by students during a two-month period following the initial course selection.

A six-way repeated measures analysis of variance and a four-way completely crossed multivariate analysis of variance were used to test the results. Of major concern was the comparison between computer assisted and counselor assisted course planning, but the effects of subjects' sex, grade level, and ability were also tested as well as all interactions among variables. The interactions were tested to determine if the two scheduling methods might have differential effects associated with certain variables. For instance, males might have a more favorable reaction to the computer-based experience than did females, but no differences were found. Also, students

in the lower quartile might have found the computerized experience too difficult but no differences were found when compared to other ability levels.

No differences, based on the four measures, were found between the experimental and control procedures and there were no interaction effects related to treatment and control procedures with any of the other variables. The students scheduled by the computer performed as well across all of the measures as did those students scheduled by the counselor.

The students' performance on the Information Test was statistically significant between grade levels. Sophomores and Juniors performed at an equal level, but both classes did significantly better on the Information Test than did the Freshmen.

There was an overall statistical significance between ability quartiles on two measures. Students in the upper quartiles had higher scores on the Information Test than did students in lower quartiles. The higher the quartile the better the student's score on the Information Test. Counselors rated the student's course elections higher if the student was in the top two quartiles than if the student was in the bottom two quartiles.

There was an overall statistical significance across all variables between the means of the males and the means of the females. The over-all mean was higher for the females than for the males.

This study used several measures to determine if a computer could be as effective as a counselor in assisting students in the exploration and selection of courses. The major hypothesis tested for a significant difference between the two groups. No differences were found between the two groups on any of the measures. Counselors were not found to be more or less effective than the computer in helping students select courses for the following school year.

Discussion

Harris (1970) has indicated that computers could perform some of the tasks counselors do if one has good script writing and an effective program to permit appropriate interaction between the computer and the student.

Therefore, a script was written and programed for the computer at Willowbrook to emphasize the individuality of the interaction. The student's grades were reviewed. The student could review the information for the calculation of rank and grade point average. An explanation of course credit was given if the student wanted it. Also, the student's vocational interest based on the Kuder and the student's future plans were compared with courses elected and courses taken. Thus, the script and the programing were instrumental in helping the computer-based system be as effective as counselors in helping students select courses.

The measures were sensitive enough to detect differences between males and females, quartiles, and grades. Therefore, if there were true differences between treatments it can be argued that the measures were sensitive enough to be able to detect those differences. Some of the evidence to support the reliability of the measures consist of the following: Females did better than did the males based on all the instruments. Those students in the upper quartiles and higher grades did better on the Information Test than did those students in the lower quartiles or lower grades. In fact the statistically significant difference between grade level on the Information Test was based on an actual two point mean difference. Hardly, a "meaningful" difference even though it was statistically significant. Thus, if any meaningful differences had existed between treatments, the statistical techniques used would have detected those differences. Another interesting finding, though not unusual, was in the counselors' ratings. The counselors found the upper two quartiles students' courses much more appropriate for them than were the lower two quartiles students' courses appropriate for them. This confirms what is known: our schools are offering curricula that are better suited to the higher ability student.

The students were asked to indicate their reaction to each method of scheduling. There were not any differences. The students liked the interacting with the

computer as well as they liked interacting with the counselor. Those students in the upper and lower ability quartiles liked one method as well as the other scheduling method. One might have suspected differences between the reactions of the boys and the girls to the two course selection methods but none were found.

The counselors rated those courses elected with the aid of a computer as high as those courses elected with the assistance of a counselor in an individual session. Also, the students had equal means on the Information Test given to them after their scheduling interview with either the computer or the counselor.

Some have expressed concern indicating that technology could not be as effective as counselors. Possible concerns are: related to the "dehumanizing" process of using man and machine interaction; boredom of upper quartile students; confusion of lower quartile students; and lack of individualized programing. None of these fears seem to be valid based on this study. A variety of independent measures were used in attempting to determine if the results from the two methods of helping students explore and select courses on the secondary level were different. No differences were found between the two course selection procedures.

Since the computer is efficient and no differences in the quality of the experience can be found Willowbrook should continue using the computer to help students select their courses.

Implications

It is continuously important, both on a short term and a long term basis, to evaluate the implications of counseling and its effect on students. It is certainly advisable to consider the role of counselors and how they can be effective in serving students at the secondary level. With the invention and growth of technology related to counseling it is certainly possible that many of the information disseminating tasks that counselors do can be done as effectively and as efficiently by technology. It is suggested that additional research be done in the area of computerized course selection, both on a short term basis and a long term basis. The amount of information that a student needs at a certain time should be integrated with his future plans, abilities and achievement. It might be helpful to develop probability statements regarding the student's probable success in a course. This could be built into a computer program and evaluated.

Another important area that can be studied are the long range effects, in terms of computer-student scheduled and counselor-student scheduled, of the successes of

students in courses elected by these two methods. A comparison of the grades achieved in the courses by those students in this study will be done during the 1971-72 school year. It is important to carefully evaluate the dropping or adding of a class. All drops or adds may not be equally bad. In fact some drops or adds could be positive. One could measure the number of courses the student thought he could select before a scheduling interview and take another measure after the scheduling interview. One of the selection methods could provide the student with more courses from which to choose.

Another area that could be explored is "attitude." Some students with a negative attitude toward counselors or toward computers may have a different reaction to a scheduling interview than those students who have a positive attitude toward computers and/or counselors.

Another area of research would be to have blind ratings by counselors done at a later date or with different information. One could provide information from junior high records or provide a more extensive statement related to future plans. Teacher recommendations could be included and/or counselor's comments. There was a high reliability in the counselor ratings for the students' schedules which increases the probability of existing differences being detected. It would be good to have the ratings at the beginning of the school year when most

changes usually occur to determine which treatment group had changed their schedule of courses the most.

This study demonstrated, based on the measures used with the population sampled, that the counselors were no more effective than the computers in assisting the students to select and explore courses on the secondary level for the following school year. It is important to continue to evaluate this process and repeat the study with similar and different populations to determine if technology can be as effective as counselors in such routine tasks, thus permitting the counselors to do other tasks that can more effectively be done by them.

REFERENCES

REFERENCES

Bailey, L. J. (Ed.) Computer-based guidance systems. Facilitating career development: An annotated bibliography. Springfield, Illinois: Division of Vocational and Technical Education, July 1970.

Clarke, R. B., Gelatt, H. B., & Levine, L. A decision-making paradigm for local guidance research. Personnel and Guidance Journal, 1965, 44, 40-51.

Computer-based vocational guidance systems. U.S. Department of Health, Education, and Welfare, Superintendent of Documents, Catalog No. 5.225: 25053, U.S. Government Printing Office, Washington, 1969.

Cooley, William. A computer-measurement system for guidance. Harvard Educational Review, 1964, 34, 559-572.

Cooley, William. Computer systems for guidance. Paper presented to Division E, American Educational Research Association annual meeting, Chicago, February 9, 1968. (Mimeographed)

Cronbach, L. J., & Gleser, G. C. The banwidth-fidelity dilemma. Psychological tests and personnel decisions. Urbana: University of Illinois Press, 1957.

Educational Technology. Counseling technology, March 1969, 9, (3).

Edwards, W. The theory of decision-making. Psychological Bulletin, 1954, 51, 380-418.

Ehling, W., & Holder, H. Complexity, variability, and lack of information in student transition from secondary school to college. The High School Journal, May, 1966, 49, 374.

Finn, J. D. Univariate and multivariate analysis of variance and covariance: A Fortran IV program. Occasional paper, No. 9, Office of Research Consultation, College of Education, Lansing, Michigan: Michigan State University, March, 1970. (Mimeographed)

Friesen, D. D. The validation of an automated counseling system. Unpublished doctoral dissertation, University of Oregon, 1965.

Harris, J. Can computers counsel? The Vocational Guidance Quarterly, 1970, 18, 163.

Harris, J. The computerization of vocational information. Vocational Guidance Quarterly, 1968, 17, 12-20.

Havens, R. I. (Ed.) Technology in guidance. The Personnel and Guidance Journal, 1970, 49, (3).

Holder, H. D., & Ehling, W. P. Construction and simulation of an information-decision model. The Journal of Communication, 1967, 17, 302.

Impellitteri, J. T. A computer-assisted career exploration system. National Business Education Quarterly, 1968, 37, 47-51.

Impellitteri, J. T. A computerized occupational information system. Vocational Guidance Quarterly, 1967, 15, 262-264.

Impellitteri, J. T. The development of a computer-assisted occupational guidance program. Journal of Industrial Teacher Education, Summer 1969.

Jennrich, R. I. 1604 Analysis of variance. Madison, Wisconsin: University of Wisconsin, Numerical Analysis Department, Laboratory Bulletin, May 15, 1961. (Mimeographed)

Katz, M. A model of guidance for career decision-making. Vocational Guidance Quarterly, 1966, 15, 2-10.

Kroll, A. M. A computer-generated bibliography of occupational information. The Vocational Guidance Quarterly, 1969, 18, 3.

Loughary, J. W., Friesen, D., & Hurst, R. Autocoun: A computer-based automated counseling simulation system. Personnel and Guidance Journal, 1966, 45, 6-15.

McGrail, T. F. MR#/307. The School Counselor, 1967, 14, 236.

McLuhan, M., & Leonard, G. B. The future of education, the class of 1989. Look, 1967, 31, 23-25.

Pierce, J. R. Information theory and psychology. Symbols, signals, and noise: The nature and process of communication. New York: Harper & Brothers, 1961.

Roberts, T. L. The uniqueness of the individual. Technical memorandum #1, AERA Symposium, 1968.

Shostrom, E. L., & Brammer, L. M. The synthesis interviews. The dynamics of the counseling process. New York: McGraw-Hill, 1952.

Stewart, J. A. Why not design ability and achievement assessment machines? Vocational Guidance Quarterly, 1967, 15, 221-223.

Super, D. E. Computer-assisted counseling. New York: Teachers College Press, Columbia University, 1970.

Super, D. E. Computers and counselor roles: Counselor acceptance of systems in guidance and eventual functions of counselors. Paper presented at symposium on the Use of computers in counseling and guidance, National Vocational Guidance Association, New York: Teachers' College, Columbia University, April 1968. (Mimeographed)

Tiedeman, D., et al. Information system for vocational decisions: Annual report, 1967-68. Cambridge, Massachusetts: Harvard Graduate School of Education, 1968.

Vriend, J. Counseling technology: A needed conceptualization. Educational Technology, 1969, 9, (3), 11.

Whitla, D. K. (Ed.) Handbook of measurement and assessment in behavioral sciences. Reading, Massachusetts: Addison-Wesley Publishing Company, 1968.

APPENDICES

APPENDIX A

WILLOWBROOK HIGH SCHOOL SELECT-A-COURSE SCRIPT

WILLOWBROOK HIGH SCHOOL

SELECT-A-COURSE SCRIPT

CVIS SELF-REGISTRATION SCRIPT

October, 1970

Welcome to Select-a-Course, Willowbrook's new approach to registration for next year's courses. We have developed this approach to give you more individualized assistance with your planning. We also hope to free counselor time for doing other important work with students which cannot be done by a computer.

This program will:

___ Present information to you about all the courses in the Willowbrook curriculum.

___ Register you for those you wish to choose.

___ Check to make sure that you have the prerequisite course you need for each.

___ Help you review your graduation requirements.

___ Comment about the relationship of your choices to your vocational and educational plans.

Let's start by finding out who you are. Please type your student number. Then shift and enter.

If I read your number correctly, you're _____. If I'm right, please type "yes". If I'm wrong, please type "wrong".

If "yes" - You're a first semester (freshman, sophomore, junior) now, second semester

aren't you? If I'm right, just shift and enter to go on. If I'm wrong, please type the number of your year in school (1 for freshman; 2 for sophomore; 3 for junior; 4 for senior) and shift and enter.

If "wrong" - Please give me another chance. Type your student number once more; then shift and enter.

I can be of more assistance to you in the selection of courses if I know your plans after high school. Please type the number of the statement which fits your present plans:

1. I do not plan to take any further schooling after high school.

2. I plan to go to a technical or specialized school. (Nursing school, beauty school, trade school, etc.)

3. I plan to go to a junior college, perhaps College of DuPage.

4. I plan to enter a four-year college.

5. I am not sure yet.

If #1

I'll remember that for later. We may want to consider courses or programs which will give you good job skills for finding your first job.

If #2

Please be more specific if you can. Which of the following do you think you will attend:

1. Beauty culture school

2. Art school

3. Three-year hospital nursing program

4. Business school

5. Technical school (auto mechanics, computer programming, etc.)

Please enter the number of your choice.

If #3

Do you know yet if you will enter:

1. Transfer program - This means that you will transfer to another school as a junior and complete four years of college.

2. Occupational curricula - This means that you plan to take an Associate of Science degree after two years of specialized vocational training and then seek employment. If you would like me to show you a list of available programs, type "PLEASE".

3. I am uncertain now.

Please enter the number of your choice.

If student types "PLEASE", show list of curricula, then re-display above.

Air Conditioning & Refrigeration

Accounting

Architecture

Banking & Finance

Building Construction

Data Processing

Electronic Technology

Fire Science

Occupations in other fields

Radio and Television (Commercial)

Health Professions

Library Technical Assistant

Media Consultant

Recreational Leadership

Retailing & Marketing

Secretarial Science

Teaching Aide Technician

Tool Design Technology

Transportation

Food Services

Graphic Arts

Interior Design

Mechanical Technology

Metals Technology

Mid-Management

Police Science

If #4

Please be more specific if you can. Will you apply to enter:

1. A private, liberal arts college or university (like Knox, Grinnell, Illinois Institute of Technology, University of Chicago)

2. A state-supported school (like Northern, Southern, University of Illinois, Illinois State, etc.)

3. I don't know yet.

If #5

Many students are not sure what they want to do after high school. Thus, selecting courses which will help to prepare you for the future depends on what you think you want to do. Please consider your interests carefully when you select your courses.

Now I'm interested in knowing how far your planning has progressed as far as a choice of occupation is concerned. Don't be upset if you can't be very specific. Choosing an occupation is a long, step-by-step process. Maybe your present step is:

1. I really don't have any idea at all about the kind of job I want.
2. I think that I could narrow my choice to broad fields, but I can't tell you a specific job.
3. I have a specific occupation in mind.

Please type the number of your choice.

If #1

Go on to "Before we begin exploration of courses, etc..."

If #2

Can you pick it out of this list?

1. Helping people - occupations like fireman, airline stewardess, social worker, counselor, psychologist, physical therapist, etc.
2. Selling - occupations like real estate sales, car sales, manufacturer's salesman, etc.
3. "White Collar" jobs - including both clerical jobs and various levels of managerial jobs in business and industry, like typist, hotel manager, accountant.
4. Technology - jobs which put scientific theory into action, like engineer, pilot, plumber, carpenter, computer programmer, etc.
5. Outdoor - occupations which are performed outside, like forest ranger, landscape architect, surveyor, farmer.
6. Science - occupations related to scientific research and application of it, like biologist, chemist, and all health careers.
7. General Cultural - occupations related to the humanities, like teacher, lawyer, minister, and journalist.

8. Arts and Entertainment - occupations like actor, musician, entertainer, interior decorator, and architect.

If #3

Please use the list of occupations which is beside your terminal and enter the code number of the occupation which you have in mind. Then shift and enter.

That occupation requires

No further training beyond high school
Some technical or specialized school training
Two or four-year college

Before we begin exploration of courses for next year, I think that it might be helpful to review Willowbrook graduation requirements and your progress toward them. The next display will compare what you've taken and passed with a total set of requirements. Shift and enter to continue.

GRADUATION REQUIREMENTS: (FOR PROGRAMMING USE ONLY)

For first-semester Freshmen: Student should be enrolled in English 9, and Physical Education 9; will not have any credits.

Second semester Freshmen: Should be enrolled in English 9 and Physical Education 9; should have 4.5 credits or more.

First semester sophomore: Should be enrolled in English 10 and Physical Education 10; should have 9.0 credits or more.

Second semester sophomore: Should be enrolled in English 10 and Physical Education 10; should have 13.5 credits or more.

First semester junior: Should be enrolled in English 11 and History 11 and Physical Education 11; should have 18.0 credits or more.

Second semester junior: Should be enrolled in English 11, History 11, and Physical Education 11; should have 22.5 credits or more.

One-year math and one-year science requirement: Look for them each year. Health units - look for passing grade each year.

X means the course has been taken and passed; * means the course is a graduation requirement, but has not been taken, or if taken, not passed yet.

Sample for second semester Freshman:

	9	10	11	12
English	x*	**	**	**
Science	x*			
Math	**			
Health	*	*	*	*
Phys. Ed.	x*	**	**	**
American History			**	
Soc. Sci. 12				**

Sample for second semester junior:

	9	10	11	12
English	xx	xx	x*	
Science		xx		
Math	xx			
Health	x	x	x	*
Phys. Ed.	xx	xx	x*	**
American Hist.			x*	
Soc. Sci. 12				**

Computer Response: All requirements are in order at this time.

OR

You are currently lacking _____(names of courses which should have been completed by this time)

_____

_____(# of credits less than expected by this time)

Basic Graduation Requirements and their Code Numbers: (FOR PROGRAMMING USE ONLY)

English 9 - E11, E12, E13, E14, E15, or E19

English 10 - E21, E22, E24, E26, E28, or E29

English 11 - E3A, E3B, E3C, E3D, E31, E39

One year of math - General Math 9 (M1B, M1H, M1S, M11)
Fund. of Algebra 9 (M13)
Algebra 9 (M15, M16)
Geometry 9 AP (M18)
Bookkeeping 10 (B22)
Business Arthmetic 10 (B21)

One year of Science - General Science (S12, S13)
Intro. Physical Science (S11)
Biology (S14, S23)
Biological Patterns & Processes (S21)
Chemistry (S33)

American History - T31, T34, T35, T39

Senior Social Science 12 - T41, T45, T48

P.E. 9
Health 9 - P11, P12

P.E. 10
Health 10 - P21, P22, P26, P27

P.E. 11
Health 11 - P31, P32, P34, P35, P36

P.E. 12
Health 12 - P41, P42, P44, P45, P46

Here's a brief review of your progress in high school from beginning of freshman year until the end of the last semester:

	F	D	C	B	A
Your grade point average is:	XXXXXXXXXXXXXX				

Your present rank in class is : ____ in a class of _____ students.

Your total number of credits is:

For explanation of grade point average, type GPA, shift and enter.

For explanation of rank, type RANK, shift and enter.

For explanation of how credits are calculated, type CR, shift and enter.

If GPA:

Semester grades since you entered high school are used for the calculation of grade point average. Courses in Physical Education, Health, Music, and staff assignments are not counted. You are given:

4 points for an A
3 points for a B
2 points for a C
1 point for a D
0 point for an F

Your total number of points is divided by the total number of courses taken in order to figure a cumulative average.

If RANK:

Rank is calculated by putting the grade point averages of all students in your class in numerical order from top to bottom. Your rank is the number of places you are from the top of the class.

If CR:

Credit is assigned as follows:

** 2 credits for a full year course (except P.E.)
* 1 credit for a one semester course.
* 1 credit for a full year of Physical Education (.25 of it for Health)
* 1 credit for a full year of office or staff work

For Freshmen:

Now I think that we're ready to think about selection of your courses for next year. Since you are a freshman now, there are two required courses for next year:

English 10
Physical Education and Health 10

There are several English 10 courses at Willowbrook. Normally a student remains in the same "track" of English for the sophomore year as he had during the freshman year.

If student has E12 this year - register for E22

If student has E13 this year - register for E24

If student has E11 this year - register for E21

If student has E14 this year - register for E26

If student has E15 this year - register for E21

If student has E19 this year - register for E29

I have registered you for English 10, Honors or Track (1, 2, or 3) for next year. If there should be any change in your English placement, or if you decide to take English 10 in summer school, please see your counselor to make a change.

Since all students must register for Phys. Ed. 10, I'm going to put that in your schedule automatically. If you have a medical excuse from P.E., please see the nurse about that at the beginning of next school year. If there is some other reason why you should not be in P.E., please see your counselor.

He or she can change the schedule which we are going to build today. (Computer registers girls for P22 and boys for P21.)

For Sophomores

Now I think that we're ready to think about selection of your courses for next year. Since you are a sophomore now, there are three required courses for next year:

English 11
American History 11
Physical Education and Health 11

There are several English 11 courses. Normally a student remains in the same "track" of English for his junior year as he had in his sophomore year.

If student	is	now	in	E22,	register	for	E3A
"	"	"	"	E24,	"	"	E3B
"	"	"	"	E26,	"	"	E3C
"	"	"	"	E28 or 29,	"	"	E39

I have registered you for English 11, Honors or track (1, 2, or 3) for next year. If there should be any change in this placement or if you plan to take this course in summer school, please see your counselor to change your schedule.

American History 11 can be taken in summer school or during the school year. What are your plans?

1. I will take it next year. (Register for T31)
2. I will take it this summer. (Store for listing later.)

Since all students must register for Physical Education 11, I'm going to put that in your schedule automatically. If you should have a medical excuse from P.E., please see the nurse about that at the beginning of next school year. If there is some other reason why you should not be

in P.E., please see your counselor. He or she can change the schedule which we are going to build today. (Computer registers boys for P 31, and girls for P32.)

For Juniors

Now I think that we're ready to think about selection of your courses for next year. Since you are a junior now, there are two required courses for next year:

Social Science 12
Physical Education and Health 12

The Social Science 12 course at Willowbrook is made up of one semester of Economics and one semester of Government. Attention is given to society's problems and pathological conditions and man's attempts to deal with them. Please indicate your plans in regard to this required course:

1. I'll take it next year.(Register student for T41)
2. I plan to take it this summer. (Record this for later listing)

If #2

Did you have American History in summer school? Please type "yes" or "no"

If yes - Sorry, you can't take this one in summer school also. I'll have to register you for it next year (Register)

If no - Fine. Be sure to register for it early in May. This course often fills early and may be closed if you wait until the end of the school year to register.

Since all students must register for Physical Education 12, I'm going to put that in your schedule automatically. If you should have a medical excuse from P.E., please see the nurse about that at the beginning of next school year. If there is some other reason why you should not be in P.E.,

please see your counselor. He or she can change the schedule which we are going to build today. (Computer registers girls for P42 and boys for P41.)

FOR ALL STUDENTS

Now we have you registered for _____ (one or two) required courses and we're ready to look at electives.

Which shall we explore first?

1. Art
2. Business Education
3. English
4. Foreign Language
5. Home Economics
6. Industrial Education
7. Mathematics
8. Physical Education & Health
9. Science
10. Social Studies
11. Work Programs

Please type in the number of your choice.

Example: (Assuming that student is a junior and has chosen #3, English.)

Here's a summary of the courses and grades you've had in this department to the present:

English 9	B	C
English 10	C	C
English 11	C	

Shift and print if you would like a copy of this.

Here are the courses in this department which are available to you next year:

E23 - Journalism 10
E37 - Theatre Arts
E41 - English Lit.
E43 - World Lit.
E45 - Humanities 12
E47 - Cinema Study
E48 - English 12 Honors
E49 - Comp.-Creative Writing
E60 - Cont. World Lit.
E63 - Lit. of Minorities

Please type in the number of the course you want to know more about.

Sample:

E47 - Cinema Study - 2 credits - 2 semesters

Purpose: To develop habits of analysis, understanding, and awareness of cinema as an art form.

Activities: Viewing films
Discussing films
Writing about films
Making films

Do you want to take this course? Please type "yes" or "no"

If "yes" and course has prerequisite:

You have passed the prerequisite course with the grade of ____(A, B, or C). Chances are good for success in this course.

OR

You received a grade of D in the prerequisite course. What would you like to do?

1. Register for this course anyway.
2. Change my course selection. (Computer takes student back to directory of departments.)

OR

Whoops! You have not taken or passed the course which is a required prerequisite.

If course has no prerequisite
OR
student has a grade of A, B, C
OR
student takes #1 alternative above

} You have now registered for a full-year elective course
OR

You have now registered for a one-semester elective course. You will need another course to go with it.

Your wish is my command:

1. I want to see additional courses in this department. (Re-display course list of same department.)
2. I want to look at courses in other departments. (Re-display directory of departments.)

3. I want to sign off and see my counselor. (Retain course selections already made.)

When student reaches a total of five subjects:

You have now registered for five subjects, including Physical Education, which is a "normal" load.

Do you wish to: 1. stop selecting courses
2. select another subject
3. look at music, office assistant, and staff assignments

If #2

Re-display catalogue of departments and proceed.

If #3

Which would you like? 1. music
2. office and staff assignments

(Display options in chosen category. Allow registration for only one thing beyond the 5th.)

If #1 - or after registration for fifth subject, or music, or staff assignments

I have you registered for the following courses:

P41 or P42 - Physical Education 12

T41 - Social Science 12

E47 - Cinema Study 12

M45 - Math 12

S43 - Physics 11

Perhaps you would like to print this display so that you can remember what courses you have registered for. Is there anything which you would like to change?

(Yes or No)

If yes (Re-display student program.)

Which course or courses would you like to change? Please type in code numbers, then shift and enter. (System deletes course)

Your wish is my command:

1. I want to see the directory of departments again.

2. I already know which course or courses I want to substitute.

3. I want to sign off and see my counselor.

If #1

Re-display department directory and allow student to register for courses to the limit of six.

If #2

Please look at the list of courses by the terminal and type in the code number or numbers of courses you wish to take. (Re-display student selections, substituting new selections.)

If #3

I'll remember where we left off and when you're ready to complete registration, let me know.

After display of current course selections:

1. You mentioned previously that you do not plan to continue formal schooling after high school. Here are the courses you've had and are registered for which may contribute toward marketable job skills:

B22 - Bookkeeping
B65 & B66 - Office Occupations
B25, B28, or B37 - Typing 11
B34 or B36 - Shorthand 11
B40 - Advanced Steno 12
B45 - Business Machines 12
B54 - Key Punch
B53 - Data Processing
B67 & B68 - Distributive Education
M53, M54, or M56 - Computer Progr.
G71 - Cosmetology
B52 - Marketing 11
Including all remaining courses under 2e.

G2A - Auto 10
G32 - Vocational Auto 11
G42 - Vocational Auto 12
G20 - Woodshop 10
G36 - Vocational Cabinet 11
G46 - Vocational Cabinet 12
G23 - Electronics 10
G33 - Vocational Electronics 11-12
G34 - Vocational Electronics 11

Will these be enough?

2. You said earlier that you plan to attend a:

a. beauty school
b. art school
c. three-year nursing program

d. business school
e. trade or technical school

2a. I see that you are registered for the cosmetology program. (If student is registered for G71.)

OR

Don't you want to consider our cosmetology program? It is a two-year program available in the junior and senior years.

2b. You have taken and plan to take the following art courses here:

A11 - Art 9
A13 - Sketching 9
A2A - Drawing 10-1st
A2B - Drawing 10-2nd
A2C - Sculpture 10-1st
A2D - Sculpture 10-2nd
A21 - Art 10
A30 - Adv. Design 11
A31 - Ceramics 11 & 12-1st
A32 - Ceramics 11 & 12-2nd
A33 - Printmaking
A35 - Painting 11-1st
A36 - Painting 11-2nd
A41 - Art 12X
A48 - Painting 12
A50 - Art Staff
A52 - Art Music Survey

Will this be enough background?

2c. You have taken and plan to take the following courses in preparation for nursing:

M13, M15, M16 - Algebra
M18, M25, M26, M27 - Geometry
S33 - Chemistry
S35 - Physiology
S21 or S23 - Biology

Would you like to consider _____, _____, or _____?
(Any of the above not already taken.)

2d. You have taken and plan to take the following courses in preparation for a secretarial career:

B22 - Bookkeeping
B65 & B66 - Office Occupations
B25, B28, or B37 - Typing 11
B34 or B36 - Shorthand 11
B45 - Business Machines 12
B40 - Advanced Steno 12
B54 - Key Punch
B53 - Data Processing
B33 - Clerical Practice

Would you like to consider _____, _____, and _____?
(Any of the above courses not already taken.)
Perhaps with this sequence, you will have the skills you desire without business school.

2e. You have taken or plan to take the following sequence of technically-oriented courses:

G2A - Auto 10
G32 - Voc. Auto 11
G42 - Voc. Auto 12
G20 - Woodshop 10
G36 - Voc. Cabinet 11
G46 - Voc. Cabinet 12

G23 - Electronics 10
G33 - Voc. Electronics 11-12
G34 - Voc. Electronics 11
G25 - Machine Shop 10
G35 - Machine Shop 11
G51 - Voc. Mach. 11-12
G27 - Tech. Drawing 10
G37 - Engr. Drawing 11-12
G53 - Blue Print Reading
G56 or G58 - Voc. Draft 11-12
G57 - Arch. Drawing 11-12
G29 - Printing 10
G39 - Printing 11
G59 or G60 - Voc. Printing 11-12
G3P - Engineering Tech.
G3R or G3S - Home Mechanics
G54 - Aircraft Construction
G55 - Aeronautics
G63, G65, or G66 - CWT
G67 & G68 - D.O.

Do we offer more in the technical field of your greatest interest? If not, perhaps you'd like to select a school from my "Technical and Specialized School" program.

3a. You have indicated a tentative plan to enter a transfer program at the junior college. You have taken or plan to take the following courses which are college-preparatory in nature?

All English, all Science except General Science (S12 & S13),

all Math except General Math (M1B, M1H, M1S, M11), all Social

Studies, all Foreign Language.

Will these be sufficient?

3b. You indicated earlier that you may enter an occupational program at the junior college. There are no specific high school course requirements for entrance to these programs.

4a &b. You said earlier that you plan to attend a four-year college. Let's see if you have taken the courses which will make you admissible to most of these:

	Usual Requirement:	Years you have completed:
English	3 years	
Foreign Lang.	2 years	
Lab Science	2 years	
Math	2 years	
Social Science	2 years	

Please check with counselors, college catalogues, and reference books for particulars about individual colleges.

<u>If student had deficiencies in graduation requirements</u>:

You have (or have not) removed the graduation deficiences which I mentioned previously.

<u>After the appropriate display</u>:

Now what would you like to do?

1. Keep the course selections already made.

2. Talk with my counselor.

3. Make a change in my selections

If #1

Good! You're all registered for next year. If you wish to make changes at a later time, please see your counselor.

If #2

Fine. I'll remember the courses already selected. You can complete registration with me later or with your counselor when you see him or her.

If #3

Go back to "Which course or courses would you like to change?" (Page 13.) Please type in the code number or numbers, then shift and enter.

After student has completed his registration or indicates that he wants to sign off and see counselor:

I would appreciate your answers to three questions. Your evaluation of this program will help us to improve it. Please shift and enter to continue.

What is your reaction to selecting courses in this way?

1. I liked it very much.
2. It was OK.
3. I disliked it.

Do you feel that your course selections are as good as if your counselor had helped you? (Yes - No)

What can we do to improve this program? Please start typing after the triangle. When you finish, shift and enter.

Willowbrook Select-A-Course is now signing off. Bye.

APPENDIX B

SCHEDULING INTERVIEW INVENTORY SHEET

SCHEDULING INTERVIEW INVENTORY SHEET

This fact sheet is designed to give us an idea of how much information you know related to courses available to you and what the graduation requirements are. Please be frank in your responses and answer all of the items. Please answer all items on the separate answer sheet. Make a heavy mark with a pencil. Erase all mistakes carefully. Return both the inventory and the answer sheet.

1. One of the most important aspects to consider when selecting courses in high school is:

   1. My interests
   2. What my parents advise me to take
   3. What I plan to do after high school
   4. I am not sure

2. Willowbrook requires ___years of English to meet the graduation requirements.

   1. $2\frac{1}{2}$
   2. 3
   3. $3\frac{1}{2}$
   4. 4

3. A student should pass ___ credits each semester to graduate with his class.

   1. 3.0
   2. 3.5
   3. 4.0
   4. 4.5

4. A student at Willowbrook has an opportunity to select courses from approximately how many departments?

   1. 1-5
   2. 6-10
   3. 11-14
   4. 15-17

5. A full-year course, such as Biology, Art 9, Algebra 9, etc., gives ___ credit(s) per year.

   1. $\frac{1}{2}$
   2. 1
   3. $1\frac{1}{2}$
   4. 2

6. A semester course such as Business Psychology, Home Management, Ceramics, etc., gives ___ credit(s) per semester.

   1. $\frac{1}{2}$
   2. 1
   3. $1\frac{1}{2}$
   4. 2

SCHEDULING INTERVIEW INVENTORY SHEET PAGE TWO

7. A student gets ___ credit(s) per year in physical education.

   1. $\frac{1}{2}$
   2. 1
   3. $1\frac{1}{2}$
   4. 2

8. The total number of credits required for graduation is?

   1. 30
   2. 34
   3. 36
   4. None of the above

9. The number of Mathematics credit(s) required for graduation is?

   1. 1
   2. 2
   3. $2\frac{1}{2}$
   4. 3

10. The number of science credit(s) required for graduation is?

    1. 1
    2. 2
    3. 3
    4. 4

11. The number of credits of physical education and health that are required for graduation is?

    1. $2\frac{1}{2}$
    2. 3
    3. $3\frac{1}{2}$
    4. 4

12. It is possible for me to take special courses to learn skills like auto mechanics or sewing if I want to.

    1. Yes, both auto mechanics and sewing
    2. Can take auto mechanics but not sewing
    3. Can take sewing but not auto mechanics
    4. Neither are available

13. A normal schedule for a student at Willowbrook is ___ courses.

    1. 4
    2. $4\frac{1}{2}$
    3. 5
    4. 6

14. A student at Willowbrook could select courses from all but which of the following departments?
    1. English
    2. Business Education
    3. Speech
    4. Social Studies

SCHEDULING INTERVIEW INVENTORY SHEET PAGE THREE

15. Which of the following courses given the least credit?

    1. Biology (full year)
    2. Vocational Bookkeeping 10 (full year)
    3. Vocational Business 10 (full year)
    4. Physical Education (full year)

16. It is most important to consider which of the following when I choose my courses?

    1. What I like to do
    2. What I plan to do when I graduate
    3. What courses I have had
    4. What my teacher says

17. Willowbrook has as a graduation requirement 3 years of which of the following courses?

    1. Science
    2. Social Studies
    3. English
    4. Mathematics

18. A student should have completed 4.5 credits in what period of time in order to graduate with his class?

    1. One quarter
    2. Three quarters
    3. Four quarters
    4. None of the above

19. A student gets 1 credit per semester from which of the following courses?

    1. Physical Education (full year)
    2. Ceramics (one semester)
    3. Health (6 weeks)
    4. None of the above

20. A student gets 2 credits per year from which of the following courses?

    1. Physical Education (full year)
    2. Home Management (one semester)
    3. Business Psychology (one semester)
    4. Personal Record-Keeping 10 (full year)

21. One should have completed 36 credits by the end of?

    1. His sixth semester
    2. His seventh semester
    3. His eighth semester
    4. None of the above

SCHEDULING INTERVIEW INVENTORY SHEET PAGE FOUR

22. Which of the following courses is a part of the graduation requirements?

    1. Drivers Education or Health 10
    2 Art 9
    3 Mathematics 11
    4. None of the above

23. Willowbrook has as a graduation requirement only one semester of which of the following courses?

    1. Mathematics
    2. Science
    3. Business
    4. None of the above

24. Willowbrook has as a graduation requirement 4 years of which of the following courses?

    1. English
    2. Mathematics
    3. Physical Education
    4. Science

25. A student has to take at least ___ credits each semester if he wishes to graduate with his class.

    1. 3.5
    2. 4.0
    3. 4.5
    4. 5.0

26. All but one of the following combinations is at least a three year graduation requirement. Which is the exception?

    1. English and Health
    2. English and Physical education
    3. English and social studies
    4. None of the above

APPENDIX C

SCHEDULING SESSION RESPONSE SURVEY

SCHEDULING SESSION RESPONSE SURVEY

This survey is designed to give us information about how you felt in the scheduling session.

Be frank in your responses. There are no right or wrong answers.

Please answer all of the items on this sheet.

DIRECTIONS

Read each statement carefully, then indicate whether you: strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree.

If you strongly agree, circle	(SA)	A	NE	D	SD
If you agree, circle.	SA	(A)	NE	D	SD
If you neither agree nor disagree, circle . .	SA	A	(NE)	D	SD
If you disagree, circle	SA	A	NE	(D)	SD
If you strongly disagree, circle.	SA	A	NE	D	(SD)

SCHEDULING SESSION RESPONSE SURVEY

Name_____ Year in school 9 10 11 12

1. There are a large variety of courses available to me . . . . . SA A NE D SD
2. I found it easy to understand what the courses are like. . . . SA A NE D SD
3. I found out about new courses in the scheduling session. . . . SA A NE D SD
4. I feel that my courses are about right for my ability. . . . . SA A NE D SD
5. It was easy to schedule my courses . . . . . SA A NE D SD
6. I was satisfied with the amount of time it took to schedule my courses . . . . . SA A NE D SD
7. The courses I selected are just what I wanted . . . . . SA A NE D SD
8. I found the course descriptions difficult to understand. . . . SA A NE D SD
9. The scheduling session made me consider what I want to do after high school. . . . . SA A NE D SD
10. I may want to change the courses I selected . . . . . SA A NE D SD
11. I had all the information available to me that I really needed to select my courses. . . . . SA A NE D SD
12. I understand what courses are required for what I want to do after I graduate . . . . . SA A NE D SD
13. I understand how to make decisions about courses that I want to take. . . . . SA A NE D SD
14. I still need more help in understanding what courses I should take for next year . . . . . SA A NE D SD
15. My schedule for next year includes too many hard courses . . . SA A NE D SD
16. I know what the requirements are for graduation because of the information available to me in the interview . . . . . SA A NE D SD
17. It was difficult to schedule my courses for next year. . . . . SA A NE D SD
18. The courses I selected are too easy for me . . . . . SA A NE D SD
19. The scheduling session was too impersonal. . . . . SA A NE D SD
20. I felt the information about the courses that I should consider was meaningful to me. . . . . SA A NE D SD

SCHEDULING INTERVIEW RESPONSE SURVEY PAGE TWO

21. I was asked questions uring the scheduling session that did not seem relevant to me. . . . . SA A NE D SD

22. I was able to select the courses I really wanted to take. . SA A NE D SD

23. I was asked questions that helped me better understand what courses I should take. . . . . SA A NE D SD

24. I disliked having to select my classes in the scheduling session. . . . . SA A NE D SD

COMMENTS:

APPENDIX D

INSTRUCTIONS TO THE COUNSELOR AND THE STUDENT SUMMARY SHEET

TO:

FROM: Gary Price

RE: Rating of the students' elections

Enclosed are the summary sheets for forty students in three grade levels. Please give an overall rating for the appropriateness of the courses selected related to the student's aptitude, achievement, sex, interest and career plans. In making this rating, consider whether or not the student has completed the necessary prerequisites to take the courses he has elected.

Please mark one overall rating for the appropriateness of the student's elections. Place an X in the box under the appropriate rating on the sheet for student scheduled. Rating scale; 5-very good, 4-good, 3-average, 2-fair, 1-poor.

ID _____ Name _____ Class of, Code ____
(to be deleted for counselor evaluation) '74 '73 '72

STS EDUCATIONAL DEVELOPMENT SERIES
National Grade Scores

GRADE TESTED	INDIVIDUAL ABILITIES, ACHIEVEMENT AND SKILLS								COMPOSITE SCORES		
	ABILITIES		LANG. STUDIES		TECH. STUDIES		SOCIAL STUDIES		BATTERY	TOTAL	BASIC
	Non-Verbal	Verbal	Read.	Eng.	Math	Science	The U.S.A.	Solving Everyday Problems	COMP.	ABIL.	SKILL

MOTIVATIONS AND INTERESTS

Present Career Plans	Present School Plans	School Interests (9 = Like Very Much, 1 = Dislike Very Much)							
		MUSIC	ART	MATH	SCIENCE	SOC. STUDIES	ENG.	FOR. LANG.	VOC.

KUDER INTEREST INVENTORY

Outdr.	Mech.	Comp.	Science	Pers.	Art	Lit.

Music	Soc. Services	Clerical

CLASSES TAKEN

Freshman Year:

Course Title	Credit	Grade

Sophomore Year:

Course Title	Credit	Grade

CAREER PLANS INDICATED NOV., 1970.

___1. No schooling after high school
___2. Go to a technical or specialized school
  ___a. Beauty culture school
  ___b. Art school
  ___c. Three-year hospital nursing program
  ___d. Business school
  ___e. Technical school
___3. Go to a junior or comm. college.
  ___a. Transfer program
  ___b. Take an occ. curriculum
  ___c. Not sure
___4. Go to a four-year college
  ___a. Private liberal arts coll. or university
  ___b. State-supported school
  ___c. Not sure
___5. I am not sure

Junior Year:

Course Title	Credit	Grade

COURSES SELECTED
for 71-72 school year

Course title	Credit

Counselor's Rating

5	4	3	2	1

APPENDIX E

COMPUTER-BASED SCHEDULING

SESSION SCRIPT

APPENDIX E

```
          W E L C O M E  T O
    S E L E C T - A - C O U R S E
YOUR SCHOOL'S NEW APPROACH TO REGISTRA-
TION FOR NEXT YEAR'S COURSES.  WE HAVE
DEVELOPED THIS APPROACH TO GIVE YOU
MORE INDIVIDUALIZED ASSISTANCE WITH
YOUR PLANNING.  WE ALSO HOPE TO FREE
COUNSELOR TIME FOR DOING OTHER IMPOR-
TANT WORK WITH STUDENTS WHICH CANNOT
BE DONE BY A COMPUTER

¢!

THIS PROGRAM WILL:
  ----PRESENT INFORMATION TO YOU ABOUT
      ALL COURSES IN THE SCHEDULE
  ----REGISTER YOU FOR THOSE YOU WISH
      TO TAKE
  ----CHECK TO MAKE SURE YOU HAVE THE
      PREREQUISITES YOU NEED
  ----HELP YOU REVIEW YOUR GRADUATION
      REQUIREMENTS
  ----COMMENT ABOUT HOW YOUR CHOICES
      RELATE TO VOCATIONAL PLANS

¢!

LET'S START BY FINDING OUT WHO YOU
ARE.

PLEASE TYPE YOUR STUDENT NUMBER,
THEN SHIFT AND ENTER.

 7325330!

IF I READ YOUR NUMBER CORRECTLY, YOU'RE
       HOOPER WILLIAM
IF I'M WRONG, PLEASE TYPE 'WRONG'.

¢!

YOU'RE A SECOND SEMESTER SOPHOMORE NOW
AREN'T YOU?  IF I'M RIGHT, JUST SHIFT
```

AND ENTER. IF I'M WRONG, PLEASE TYPE THE NUMBER OF YOUR YEAR IN SCHOOL (1 FOR FRESHMAN; 2 FOR SOPHOMORE; 3 FOR JUNIOR)

I CAN BE OF MORE ASSISTANCE TO YOU IN THE SELECTION OF COURSES IF I KNOW YOUR PLANS AFTER HIGH SCHOOL. PLEASE TYPE THE NUMBER OF THE STATEMENT WHICH FITS YOUR PRESENT PLANS:

1. NO FURTHER SCHOOLING AFTER HIGH SCHOOL.
2. TECHNICAL OR SPECIALIZED SCHOOL.
3. JUNIOR COLLEGE
4. FOUR-YEAR COLLEGE
5. I AM NOT SURE YET

¢4!

PLEASE BE MORE SPECIFIC IF YOU CAN. WILL YOU APPLY TO ENTER:

1. A PRIVATE, LIBERAL ARTS COLLEGE

2. A STATE-SUPPORTED SCHOOL.

3. I DON'T KNOW YET.

¢2!

BEFORE WE BEGIN EXPLORATION OF COURSES FOR NEXT YEAR, I THINK THAT IT MIGHT BE HELPFUL TO REVIEW YOUR SCHOOL'S GRADUATION REQUIREMENTS AND YOUR PROGRESS TOWARD THEM. THE NEXT DISPLAY WILL COMPARE WHAT YOU'VE TAKEN AND PASSED WITH A TOTAL SET OF REQUIREMENTS.

SHIFT AND ENTER TO CONTINUE.

¢!

WILLOWBROOK GRADUATION REQUIREMENTS

		9	10	11	12
ENGLISH	--	BB	NN	**	
SCIENCE	--	BB			
MATHEMATICS	--	CC			
HEALTH	--	A*	*	*	*
PHYSICAL ED.	--	BB	NN	**	**
AMERICAN HISTORY	--			**	
SOC. SCIENCE 12	--				**

*--REQUIRED, NOT TAKEN N--NOW TAKING

¢!

```
HERE'S A REVIEW OF YOUR SCHOOL PROGRESS
FROM THE TIME YOU ENTERED HIGH SCHOOL
UNTIL NOW:
                    F    D    C   B     A
GRADE POINT AVER:  XXXXXXXXXXXXX

RANK  IN  A  CLASS  OF  857  IS  150

CREDITS                    LACKING

 CREDITS MISSING  HAS 12.50 TO DATE!

IF YOU WOULD LIKE AN EXPLANATION OF:
    --GRADE POINT AVERAGE-->TYPE GPA
    --RANK-->TYPE RANK
    --HOW CREDITS ARE CALCULATED-->TYPE C

IF YOU DO NOT DESIRE AN EXPLANATION,
JUST SHIFT AND ENTER.

¢!

   THERE ARE 3 THINGS TO REMEMBER:
***1ST SEM. COURSES ARE MARKED 'A'
   2ND SEM. COURSES ARE MARKED 'B'
***THIS PROGRAM CAN ONLY REGISTER YOU
   FOR COURSES FOR WHICH YOU HAVE PRE-
   REQUISITES.  SEE YOUR COUNSELOR FOR
   ANY TYPE OF SPECIAL CONSIDERATION.
***STUDENTS ARE SELECTED FOR HONORS
   COURSES AND SPECIAL PROGRAMS IN THE
   SPRING. AT THIS TIME, ALL STUDENTS
   ARE PLACED IN REGULAR SECTIONS.
¢!

NOW I THINK WE'RE READY TO THINK ABOUT
SELECTION OF YOUR COURSES FOR NEXT YEAR.
SINCE YOU ARE A SOPHOMORE NOW, THERE ARE
THREE REQUIRED COURSES FOR NEXT YEAR.
         ENGLISH 11
         AMERICAN HISTORY 11
         PHYSICAL ED. AND HEALTH 11

¢!

THERE ARE SEVERAL ENGLISH 11 COURSES.
NORMALLY A STUDENT REMAINS IN THE SAME
'TRACK' OF ENGLISH FOR HIS JUNIOR YEAR
AS HE HAD IN HIS SOPHOMORE YEAR.

I HAVE REGISTERED YOU FOR ENGLISH 11,
TRACK 1 FOR NEXT YEAR.
```

IF THERE SHOULD BE ANY CHANGE IN THIS PLACEMENT OR IF YOU PLAN TO TAKE THIS COURSE IN SUMMER SCHOOL, PLEASE SEE YOUR COUNSELOR TO CHANGE YOUR SCHEDULE.
¢!

I WILL REGISTER YOU FOR THE REQUIRED JUNIOR COURSE, AMERICAN HISTORY.
SOME SPECIAL COURSES WHICH MEET THIS REQUIREMENT ARE SET UP IN THE SPRING.
THE COURSES WILL BE EXPLAINED TO YOU, AND YOU WILL HAVE A CHANCE TO APPLY FOR THEM.

¢!

WE HAVE REGISTERED YOU FOR THE REQUIRED COURSES AND ARE READY TO LOOK AT ELECTIVES. WHICH SHALL WE EXPLORE NEXT?

1.	ART	8.	INDUST ED CONT.
2.	BUSINESS (YR)	9.	MATHEMATICS
3.	BUSINESS (SEM)	10.	MUSIC
4.	ENGLISH	11.	PHYS. EDUCATION
5.	FOR. LANGUAGE	12.	SCIENCE
6.	HOME ECONOMICS	13.	SOCIAL STUDIES
7.	INDUST EDUC	14.	WORK-STUDY PROG

ENTER DEPARTMENT NUMBER (ONE NUMBER).
¢5!

THE COURSES AND GRADES WHICH YOU HAVE HAD IN THIS DEPARTMENT ARE LISTED BELOW:

LATIN 10	B	B

SHIFT AND PRINT IF YOU WOULD LIKE A COPY
¢!

OTHER COURSES IN THIS DEPARTMENT ARE:

L01 GEN LANG 9B	L03 STU SKILL A
L04 STU SKILL B	L11 FRENCH 9
L13 GERMAN 9	L15 LATIN 9
L17 SPANISH 9	L35 LATIN 11
L37 SPANISH 11	

TYPE COURSE CODE FOR INFORMATION.
¢L35!

LATIN 11 - FULL YR - 2 CREDITS -
PREREQUISITE: LATIN 10
PURPOSE: TO TRAIN STUDENTS TO READ AND TRANSLATE LATIN WITH INCREASING SPEED AND COMPREHENSION. TO IMPROVE STUDENTS

```
ABILITY TO EXPRESS HIMSELF IN CLEAR &
COMMENDABLE ENGLISH BY TRANSLATION OF
LATIN.  TO DEVELOP IN THE STUDENTS AN
UNDERSTANDING OF THE SIGNIFICANCE OF
IMPORTANT EVENTS IN THE POLITICAL & LIT-
ERARY HISTORY OF ROME.
¢!

    DO YOU WANT TO REGISTER FOR
    THE COURSE WHICH YOU HAVE JUST
    SEEN?  (YES-NO).

 YES!

YOU HAVE PASSED THE PREREQUISITE COURSE
WITH A GRADE OF B.
CHANCES ARE GOOD FOR SUCCESS IN THIS
COURSE.

YOU HAVE NOW REGISTERED FOR A FULL-YEAR
COURSE.

¢!

YOUR WISH IS MY COMMAND:
1.  I WANT TO LOOK AT MORE COURSES.

2.  I WANT TO SIGN OFF AND SEE MY
    COUNSELOR.

¢!

WE HAVE REGISTERED YOU FOR THE REQUIRED
COURSES AND ARE READY TO LOOK AT ELEC-
TIVES.  WHICH SHALL WE EXPLORE NEXT?
  1.  ART              8.  INDUST ED CONT.
  2.  BUSINESS (YR)    9.  MATHEMATICS
  3.  BUSINESS (SEM)  10.  MUSIC
  4.  ENGLISH         11.  PHYS. EDUCATION
  5.  FOR. LANGUAGE   12.  SCIENCE
  6.  HOME ECONOMICS  13.  SOCIAL STUDIES
  7.  INDUST EDUC     14.  WORK-STUDY PROG
ENTER DEPARTMENT NUMBER (ONE NUMBER).
¢12!

THE COURSES AND GRADES WHICH YOU HAVE
HAD IN THIS DEPARTMENT ARE LISTED BELOW:
     BIOLOGY 9 B          B     B

SHIFT AND PRINT IF YOU WOULD LIKE A COPY
¢!
```

```
OTHER COURSES IN THIS DEPARTMENT ARE:
S11 1P SCI 9          S13 GEN SCI 9
S23 BIO 10            S31 NURS CHEM
S33 CHEM 11           S35 PHYSIOLOGY
S43 PHYSICS 11        S51 ADV PHYS SCI

TYPE COURSE CODE FOR INFORMATION.
¢S33!

CHEMISTRY 11 - FULL YR - 2 CREDITS -
 PREREQUISITE-ALG.9 - RECOMMEND GEO 10.
TO ACQUAINT THE STUDENT WITH CHEMICAL
REACTIONS AND PROCESSES.

ACTIVITIES-LAB ORIENTED. STUDENT WILL
SPEND BULK OF TIME IN LAB STUDYING CHEMI
CAL REACTIONS BOTH QUANTITATIVELY AND
QUALITATIVELY.

¢!

    DO YOU WANT TO REGISTER FOR
    THE COURSE WHICH YOU HAVE JUST
    SEEN?  (YES-NO).

 YES!

YOU HAVE PASSED THE PREREQUISITE COURSE
WITH A GRADE OF C.
CHANGES ARE GOOD FOR SUCCESS IN THIS
COURSE.

YOU HAVE NOW REGISTERED FOR A FULL-YEAR
COURSE.

YOU HAVE NOW REGISTERED FOR FOUR
ACADEMIC SUBJECTS PLUS PHYSICAL EDUCA-
TION, WHICH IS A NORMAL LOAD.
DO YOU WISH TO:
     1.  STOP SELECTING COURSES
     2.  SELECT ANOTHER SUBJECT
     3.  LOOK AT OFFICE ASSISTANT AND
         STAFF ASSIGNMENTS.

¢1!

I HAVE REGISTERED YOU FOR THE FOLLOWING:
     P31 PE BOYS 11 1
     E3A ENGLISH 11 1 1
     T31 AMER HIST 11
     L35 LATIN 11
     S33 CHEM 11 SECT 1
```

PRINT THIS DISPLAY SO YOU CAN REMEMBER
WHAT COURSES YOU HAVE REGISTERED FOR.
¢!

IS THERE ANYTHING WHICH YOU WOULD
LIKE TO CHANGE: (YES-NO).

NO!

IF YOU LATER DECIDE TO CHANGE ONE OF
YOUR REQUESTS, YOU MAY SEE YOUR COUNSE-
LOR. NOW WE WILL COMPARE YOUR SCHOOL
RECORD WITH YOUR EDUCATIONAL PLANS.

¢!

YOU HAVE TAKEN THE COURSES LISTED BELOW
WHICH ARE RELATED TO YOUR PLANS TO ATTEND
A FOUR YEAR COLLEGE.

E19 ENGLISH 9 HNR	E29 ENGLISH 10 HNR
E3A ENGLISH 11 1 1	S14 BIOLOGY 9 B
S33 CHEM 11 SECT 1	T23 HIST NON WW 10
T31 AMER HIST 11	M16 ALGEBRA 9 AP
M25 GEOMETRY 10	L25 LATIN 10
L35 LATIN 11	ASK YOUR COUNSELOR

ABOUT PARTICULARS FOR INDIVIDUAL COLLEGE
¢!

YOU HAVE NOW COMPLETED YOUR REGISTRATION
FOR NEXT YEAR. IF YOU WISH TO MAKE
CHANGES AT A LATER TIME, PLEASE SEE YOUR
COUNSELOR. PLEASE TAKE TIME TO ANSWER
A FEW QUESTIONS BEFORE YOU LEAVE.

¢!

I WOULD APPRECIATE YOUR REACTIONS TO A
FEW QUESTIONS BEFORE YOU LEAVE. YOUR
EVALUATION OF THIS PROGRAM WILL HELP US
TO IMPROVE IT.
WHAT IS YOUR REACTION TO SELECTING
COURSES IN THIS WAY?

1. I LIKED IT VERY MUCH.
2. IT WAS OK.
3. I DISLIKED IT.

¢!

WHY DID YOU LIKE 'MACHINE REGISTRATION'?
1. IT WAS VERY FAST
2. I COULD REVIEW MY COURSES AND GRADES

3. IT HELPED ME RELATE MY FUTURE PLANS
   COURSE SELECTION
4. I WAS FREE TO MAKE MY OWN DECISIONS
5. IT CONTAINED A LOT OF INFORMATION AB
   COURSES.
6. OTHER

TYPE IN AS MANY ANSWERS AS YOU WISH, THE SHIFT AND ENTER.
¢146!

DO YOU FEEL THAT YOUR COURSE SELECTIONS ARE AS GOOD AS IF YOUR COUNSELOR HAD HELPED YOU? (YES-NO)

YES!

WHAT CAN WE DO TO IMPROVE THIS PROGRAM? PLEASE TYPE IN YOUR SUGGESTIONS BEGINNING IMMEDIATELY AFTER THE 'START' SYMBOL, THEN SHIFT AND ENTER.

¢!

WILLOWBROOK SELECT-A-COURSE IS NOW SIGNING
O F F.