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AN EVALUATION OF THE LANDSCAPE AND NURSERY TECHNICIAN PROGRAM AT MICHIGAN STATE UNIVERSITY

By

Donald Eugene Elson

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
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ABSTRACT

AN EVALUATION OF THE LANDSCAPE AND NURSERY TECHNICIAN PROGRAM AT MICHIGAN STATE UNIVERSITY

BY

Donald Eugene Elson

Purpose. This research was concerned with an evaluation of the Landscape and Nursery Technician program at Michigan State University. The objectives of the study were to: (1) determine the reasons why former students left the program; (2) ascertain the job history of the former students; (3) determine the amount, kind, and source of additional formal education received by former students since leaving the program; (4) determine the ability of the persistent former students to function effectively with other employees; (5) determine the extent of participation by persistent former students in activities which affect the community and the landscape and nursery industry; (6) determine when the persistent former students learned the most about each of fifty-five selected competencies; (7) determine the importance of selected competencies as perceived by persistent former students and employers; (8) determine the ability of persistent former students to perform the selected competencies; and (9) determine those competencies needed by supervisory or technician

level personnel, but not provided to students while they were enrolled in the technical program.

Methodology. The population consisted of former students of the Landscape and Nursery Technician program who graduated or were scheduled to graduate in 1966, 1967, 1968, 1969, and 1970. Also included in the population were thirty-eight employers of former students working in the landscape and nursery industry. One hundred sixty-two former students were contacted by telephone to obtain basic data. Eighty-two per cent of them responded to a two-part questionnaire. The first part of the questionnaire concerned personal data and reactions to the program. In the second part, the former students were asked to judge the importance of fifty-five selected competencies and provide ratings of their abilities to perform these competencies. Seventy-nine per cent of the employers responded to a mailed questionnaire. This questionnaire contained two sections. In the first section, employers were asked to rate former students, now in their employ, on twelve personality traits and on the quantity and quality of their work. In a second section, they were also asked to judge the importance of fifty-five selected competencies and to rate the abilities of former students in their employ, to perform them. Statistical tests used in the study included analysis of variance, Pearson product-moment correlation, and Student's *t*.

Findings. Nearly one-half of the former students who withdrew from the Landscape and Nursery Technician program transferred to another college or participated in other formal educational programs after leaving the program. Attainment of associate, baccalaureate, or higher degrees is within the abilities of many former students of the Landscape and Nursery Technician program. Graduation from the Landscape and Nursery Technician program and persistence in the landscape and nursery industry do not necessarily result in increases in job satisfaction, job stability, or salary. The Landscape and Nursery Technician program appears to provide a practical education; however, a wider range of courses would seem to improve the program.

Employers tend to rate persistent graduates higher than persistent dropouts on twelve personality traits. Persistent graduates also exhibit greater social and civic responsibilities when compared to persistent dropouts.

Former students and their employers agree that competencies in the areas of human relations are the most important for successful employment in the landscape and nursery industry. Self-assessment by former students and ratings by employers indicate that former students are most capable of performing competencies related to the areas of working with people and customer relations, while they seem to be lacking in abilities related to soil science. Persistent former students, now employed, perceived that they learned most about a majority of the competencies in situations other than in the Landscape and Nursery Technician program.

DEDICATION

This thesis represents a point in my educational career which would never have been reached if it had not been for the love, encouragement, and sacrifices of my parents, Mr. and Mrs. Lester C. Elson.

Donald E. Elson

ACKNOWLEDGEMENTS

The writer wishes to express appreciation to all those assisting in the completion of this study.

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The writer is indebted to the members of the jury, former students, and employers who participated in this study, without whose assistance the study could not have been conducted.

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TABLE OF CONTENTS

LIST OF TABLES

TABLE PAGE

TABLE PAGE

TABLE PAGE

CHAPTER I

INTRODUCTION

Indicative of the importance of education in our society is the increasing expenditure of money in public education by the federal government. This additional investment of resources in education has brought with it greater concern for the effectiveness of programs receiving support. One segment of education benefiting from additional support of the public is vocational-technical education. Evaluation of vocational-technical education, as in other educational programs, has been neglected.

Among those involved, few will deny that evaluation of programs in areas such as vocational-technical education is a laborious endeavor. The task of evaluation not only requires additional effort and resources on the part of local leadership, but it also may pose for some the potential threat of revealing facts which reflect discredit on existing programs.

Large, continuous expenditures of public money on vocational-technical education eventually attracts the attention of individuals and groups who subsequently demand close and critical evaluation of the educational effort. This concern focuses greater attention on the accomplishments of vocational-technical education.

The pressures are great for careful evaluation of vocational-technical endeavors, even to the point of being mandated by the United States Congress. The National Advisory Council is required to "...conduct independent evaluations of programs..." receiving federal assistance under the Vocational Education Amendments of 1968, PL 90-576[1]. The vocational educator faces the need to accept the concept of evaluation as an integral part of the curriculum.

PURPOSE

This research is concerned with an evaluation of the Landscape and Nursery Technician program at Michigan State University. The evaluation was conducted by a follow-up of former students of the program and of those landscape and nursery employers who hired many of these students.

OBJECTIVES

The objectives of the follow-up study were to:

1. Determine the reasons why former students left the program.
2. Ascertain the job history of the former students.

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[1]United States Congress, "Vocational Education Amendments of 1968, PL 90-576." Title I, section 104, a2C. October 1968. United States Statutes at Large, Vol. 82 (Washington, D. C.: United States Government Printing Office,1969) p. 1067.

3. Determine the amount, kind, and source of additional formal education received by former students since leaving the program.
4. Determine the ability of the persistent[2] former students to function effectively with other employees as perceived by their employers.
5. Determine the extent of participation by persistent former students in activities which affect the community and the landscape and nursery industry.
6. Determine when the persistent former students learned the most about each of the selected competencies.
7. Determine the importance of selected competencies as perceived by persistent former students and employers.
8. Determine the ability of persistent former students to perform the selected competencies as perceived by the persistent former students and employers.
9. Determine those competencies needed by supervisory or technical level personnel, but not provided to students while they were enrolled in the technical program.

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[2]See Definition of Terms, page 5.

HYPOTHESES

1. Job satisfaction, salary, and job stability are each directly related to persistence in the technical training program and occupational persistence.
2. Significant differences exist in the ratings of persistent former students and their employers regarding the importance of selected competencies needed by persons in supervisory or technician level positions.
3. Significant differences exist in the ratings of the ability of persistent former students to perform selected competencies as rated by the students and their employers.

DEFINITION OF TERMS

1. Dropouts: Students who completed one or more terms in the Landscape and Nursery Technician program, but did not complete requirements for graduation.
2. Graduates: Students who completed requirements for graduation from the Landscape and Nursery Technician program.

3. Former students: All students, including graduates and dropouts, who completed one or more terms in the Landscape and Nursery Technician program.
4. Persisters: Former students who were employed in the landscape and nursery industry and former students who were enrolled in a horticulture or landscape architecture program other than the Landscape and Nursery Technician program. Former students in the military service, but who entered the service from either the status of a student or an employee in the landscape and nursery fields, were considered to be persisters.
5. Non-persisters: Former students not employed in the landscape and nursery industry and former students not enrolled in a horticulture or landscape architecture program. Former students in the military service, but who entered the service from either the status of a student or an employee in an occupation other than in the landscape and nursery field, were considered to be non-persisters.
6. Employers: Individuals, organizations, or firms who employed former students in the landscape and nursery industry.

BASIS FOR STUDY

Systematic evaluation of educational programs, especially those in vocational-technical education, is one of the primary concerns in education today. Dressel presented three approaches to evaluation: assessment of environmental characteristics, examination of the educational process, and appraisal of results.[3] The environment, physical and psychological, imposes limitations on the educational process. Consideration of the educational process brings about an examination of the actual characteristics of an organization and the experiences it provides. The third approach, appraisal of results, permits a consideration of attitudes and competencies of the persons who have participated in the educational program. Dressel stated that:

> ...evaluation of any program must rest upon the success of individuals in achieving the stated objectives, it is also advisable and even necessary to engage in evaluation of the educational process and of the environmental characteristics in which this process takes place.[4]

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[3]Paul L. Dressel. "Procedures in the Evaluation of Educational Programs." (paper presented at Evaluation Systems Project Workshop, Michigan State University, East Lansing, May 1966.) p. 2.

[4]Ibid., p. 7.

Norton[5], O'Connor[6], and Whinfield[7] seemed to support a process of evaluation which incorporated those three approaches. As a starting point in evaluation of educational programs, they recommended feedback from the former students as the first source of evaluative information. Berty stated: "Product evaluation, measurement of the performance of students, holds the greatest promise for helping to improve the overall educational program."[8] The major method for obtaining information from the former students of an educational program is the follow-up study.

NEED FOR THE STUDY

According to Sharp and Krasnegor, very few evaluation studies of vocational education have been conducted at the

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[5]Robert E. Norton. "Improving Vocational Education Evaluation." (paper presented at the Sixty-Third Annual American Vocational Association Convention, Boston, Mass., 1969.) p. 4.

[6]Thomas O'Connor. "Follow-up Studies in Junior Colleges, A Tool for Instructional Improvement." (Washington, D. C.: American Association of Junior Colleges, 1967.) p. 14.

[7]Richard W. Whinfield. "Review and Synthesis of Research of Placement and Follow-up of Vocational Education Studies." (paper presented at the Sixty-Third Annual American Vocational Association Convention, Boston. Mass.. Storrs: University of Connecticut, 1969.) p. 3.

[8]Ernest Berty. "Some Principles and Practices of Evaluation." (paper presented to West Virginia State Department of Education In-Service Program, November 1968.) p. 5.

post-secondary level.[9] They indicated that very little is known about the student or graduate of post-secondary vocational education. Their study revealed a lack of follow-up information related to those trained in technical institutes and junior colleges. They also pointed out that more needs to be known about long-term career patterns, as well as the post-secondary students' attitudes toward their training and employment.

The follow-up procedure applied in this study provided useful feedback information from former students of the Landscape and Nursery Technician program in the Institute of Agricultural Technology, Michigan State University. Technical programs have been offered in production agriculture since 1894.[10] Agricultural industry programs were begun by the Institute in 1945. A program for landscape and nursery technicians was one of the first to be established. Since then the number of industry programs has increased to ten. With the exception of the Farm

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[9]Laure Sharp and Rebecca Krasnegor. "The Use of Follow-up Studies in the Evaluation of Vocational Education." (Washington, D. C.: Bureau of Social Science Research, May 1966.) pp. 1-18.

[10]D. L. Anderson. "The History and Development of Short Courses at Michigan State University." (College of Agriculture, Michigan State University, East Lansing, February 1966.) pp. 4-9.

Equipment Service and Sales[11] and the Elevator and Farm Supply[12] programs, no formal, systematic program evaluations have been attempted.

DELIMITATIONS

This study was limited to former students of the Landscape and Nursery Technician program, Institute of Agricultural Technology, Michigan State University, who were scheduled to graduate in 1966, 1967, 1968, 1969, and 1970.

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[11]Steven Bolen. "1965-1970 Alumni Survey, Farm Equipment Service and Sales Program." (staff study, Department of Agricultural Engineering, Michigan State University, East Lansing. 1970).

[12]Harold Ecker. "Follow-up of the Elevator and Farm Supply Graduates." (staff study, Institute of Agricultural Technology, Michigan State University, East Lansing. 1962).

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this study is to evaluate by means of a follow-up procedure, the Landscape and Nursery Technician program at Michigan State University. The review of literature reported in this chapter has been focused on reports of research and other writings relevant to evaluation of post-secondary technical education. While the various aspects of a program evaluation are considered, emphasis is placed upon use of the follow-up study as a means of evaluation.

DEFINITIONS OF EVALUATION

It may be appropriate to begin by defining evaluation. Dressel indicated that the task of evaluation is, "...that of making judgments about the worth or value of whatever object, process, or person is being evaluated...evaluation then becomes both a goal of an educational experience and a means of improving that experience."[1]

Evaluation, according to Berty, is the process of determining the extent to which specific objectives have

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[1]Paul L. Dressel. "Procedures in the Evaluation of Educational Programs." (presented as a paper at Evaluation Systems Project Workshop, Michigan State University May 1966.) p. 1.

been reached.[2] He continued by stating that evaluation can be used to determine the achievement level of students; to diagnose learning problems; or to appraise the effectiveness of curricula, courses, instructional materials, and administrative and organizational structures.

Norton offered a definition of program evaluation when he declared:[3]

> Program evaluation is the continuous process of collecting valid and reliable data for the purpose of comparing program outcomes with program objectives. The process is conducted to provide useful information for making sound educational decisions. Educational decisions refer to making a choice among alternatives for action in response to educational needs and resources.

Hagen and Thorndike define evaluation, "as describing something in terms of selected attributes (objectives) and judging the degree of acceptability or suitability of that which has been described."[4] They indicated that evaluation could be concerned with the total program, a curricular procedure, or an individual or group of individuals.

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[2]Ernest Berty. "Some Principles and Practices of Evaluation." (paper presented to West Virginia State Department of Education In-Service Program. November 1968.) p. 3.

[3]Robert E. Norton. "Guides to Improving Vocational Education Evaluation," (College of Education, University of Arkansas, Fayetteville. December 1970.) p. 2.

[4]Elizabeth Hagen and Robert Thorndike. "Evaluation." Encyclopedia of Educational Research. (New York: Macmillan Co., 3 rd. ed., 1960.) pp. 482-85.

Guba describes evaluation as "a process of providing and using information for making educational decisions."[5] He saw evaluation as "continuing, multifaceted, practical, and relevant."

Most other definitions of evaluation are based on the congruence of the performance of the individual and the objectives of the program -- the outcomes or product of the program. Feedback is an essential part of evaluation according to these definitions. Guba considered this concept of evaluation to be the major shortcoming of such definitions, for he contends that feedback cannot take place until after the termination of a program and the outcomes are known.[6]

PURPOSES OF EVALUATION

According to the definitions presented in the previous section, evaluation should be viewed as a process of obtaining objective data essential to effective and efficient decision-making and program planning. Dressel considers educational planning as a:[7]

> ...continuing activity in which one assesses a situation, makes certain assumptions and states goals,

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[5]Egon G. Guba. "Evaluation and Changes in Evaluation." (paper presented at Elk Grove Training and Development Center Spring Evaluation Conference, Arlington Heights, Ill. 1968.) p. 11.

[6]Ibid., p. 11.

[7]Dressel, op. cit., p. 7.

develops a program to achieve these, evaluates the results, and then returns to making modifications and, hopefully, improving the program.

Evaluation should not be considered an end product. As noted previously, Guba considered evaluation as continuous over the entire program, while Norton indicated that there should be a continuous evaluation of the outcomes of the program.

Smith and Tyler, in reporting the results of the Eight-Year Study, listed five major purposes of evaluation.[8]

1. To make a periodic check on the effectiveness of the educational institution, and thus indicate the points at which improvements in the program are necessary.

2. To validate the hypotheses upon which the educational institution operates.

3. To provide a certain psychological security to the school staff, to the students, and parents.

4. To provide information basic to effective guidance of individual students.

5. To provide sound basis for public relations.

Norton pointed out that evaluation, as an integral part of decision-making, provides information for the "program manager" so he is able to do a better job of allocating the limited resources available to maximize the attainment of the program objectives.[9]

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[8]Eugene Smith and Ralph Tyler. Appraising and Recording Student Progress. (New York: Harper and Brothers. 1942.) pp. 7-11.

[9]Norton, loc. cit., p. 2.

Sutherland proposed the following set of principles which he considered to be basic to the process of evaluation.[10]

1. Evaluation, and particularly evaluation of educational programs, should be made in terms of the objectives of the program.

2. Evaluations should include assessments and appraisals of both product and process.

3. Evaluation should be a continuous process, not just a "point-in-time" judgment.

4. Evaluation should be made by teams comprised of both professional and lay personnel.

5. Evaluation of publicly supported programs should include economic factors and concern itself with input-output relationships.

6. Evaluations and appraisals should be made not only on the basis of what has been done, but also on what should have been done.

7. The major purpose of evaluation should be made to provide quality control and a basis for intelligent change.

8. An evaluation should concern itself primarily, if not exclusively, with the key indicators of success or failure.

Reynolds, Grobman, and McGee stated that, "the evaluation procedure should stress the forward look -- the forward march toward constant improvement and growth of

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[10]Sid S. Sutherland. "Objectives and Evaluation in Vocational Agriculture." Evaluation and Program Planning in Agricultural Education. (a report of a national seminar. Columbus: Center for Vocational and Technical Education, The Ohio State University. 1966.) pp. 14-17.

quality education.[11] They also contend that evaluation must be flexible and subject to change to be of most value.

METHODOLOGY OF EVALUATION

Skepticism, budgets, and lack of qualified personnel are obstacles to program evaluation according to Little. He explained by asserting:[12]

> ...surveys of research activity reveal that few state departments or school systems have plans to make systematic evaluations of the worth of their vocational education programs. ...evaluation of educational programs is a recent intruder into the bailiwick of educational administrators and government planners. Some school officers are skeptical of the objectives of such procedures. Some question their applicability. Some doubt the methods used. More have neither research budgets or skilled research workers for mounting such evaluative efforts.

Hagen and Thorndike recommended the following changes for improving evaluative research:[13]

1. improve procedures for identifying the significant educational outcomes and translating them into observable student behaviors.

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[11]Harris W. Reynolds, Sydney M. Grobman, and Ivan C. McGee. "Evaluative Criteria for Vocational Technical Programs." (Commonwealth of Pennsylvania: Department of Public Instruction. 1967.) p. 3.

[12]Hagen and Thorndike. loc. cit., pp. 482-85

[13]Kenneth J. Little. "Review and Synthesis of Research on the Placement and Follow-up of Vocational Education Students." Research Series No. 49. (Center for Vocational and Technical Education. The Ohio State University, Columbus. February 1970.) pp. 35-36.

2. improve devices for appraising these student behaviors -- improved in the sense of being more valid, more reliable, or more administratively feasible.

3. improve ways of integrating the results of these appraisals into a comprehensive evaluation of student or school programs.

Norton suggested that an on-going evaluation system needed to be established in every school and state in the nation.[14] He recommended that these systems be established as soon as possible. Furthermore, he urged that those responsible for setting up the systems should seek to improve present evaluative techniques as well as develop new and better ones. Norton concluded by stating, "We must evaluate our own programs or others will do it for us."[15]

The first step in evaluation is a definition of the program objectives. Smith and Tyler suggested that the kinds of changes in behavior patterns in human beings which the school seeks to bring about are its educational objectives. An educational program is appraised by finding out how far the objectives of the program are actually being realized.[16]

The evaluator may be confronted with the problem that all too often program objectives are vaguely stated, if they

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[14]Norton. op. cit., p. 7.

[15]Ibid.

[16]Smith and Tyler. op. cit., pp. 11-15.

are stated at all. When they are stated, they may be in unmeasurable terms and not specific for individual programs. Dressel pointed out that objectives should be stated, "in terms of the behavioral outcomes desired in students who complete the program...(and) may even go so far as to specify the level of competency with regard to specific outcomes."[17]

The objectives of the Landscape and Nursery Technician program, Institute of Agricultrual Technology, Michigan State University are stated in terms of the behavioral outcomes desired in the students. There are five major objectives.[18]

1. To develop competencies needed by individuals engaged in or preparing to engage in supervisory or technician positions in the landscape and nursery industry.

2. To develop an understanding of the landscape and nursery industry so the individual can make a decision as to his place in the industry.

3. To secure satisfactory employment and to advance in the landscape and nursery industry through a program of continuing education.

4. To develop those abilities in human relations which are essential for satisfactory performance in the landscape and nursery industry.

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[17]Dressel. op. cit., p. 4.

[18]"Program Objectives -- Landscape and Nursery Technician Program." (East Lansing: Institute of Agricultural Technology, Michigan State University. 1971.) pp. 1-3. (Mimeographed)

5. To develop the abilities needed to exercise and follow effective leadership in fulfilling occupational, social, and civic responsibilities.

Each of the above objectives has a set of contributory objectives which specify competencies.[19]

The "goals-outcomes" approach is recommended by Byram. He suggested that the school should consider how well it is achieving the goals of occupational preparation which it has accepted as outcomes for its instructional program.[20] Only by making the objectives explicit can their appropriateness be judged and only through the objectives can the success of a program be judged.[21]

Process Evaluation

Byram and Robertson presented one perspective of product and process evaluation.[22]

> The basic concern of people affected by programs of occupational education is whether they are getting what they hope to from the programs, and whether this is worth what they are putting into them. This is the

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[19]Appendix A.

[20]Harold M. Byram. "Evaluation of Local Vocational Education Programs: A Manual for Administrators, Teachers, and Citizens." (Bureau of Research Services. East Lansing: College of Education, Michigan State University. 1965.) p. 4.

[21]Burton A. Weisbrod. "Conceptual Issues in Evaluating Training Programs." Monthly Labor Review, Vol. 89, No. 10, October 1966. pp. 1091-97.

[22]Harold Byram and Marvin Robertson. "A Manual for Administrators, Teachers, and Citizens." Third Edition. (East Lansing: College of Education, Michigan State University. March 1970.) p. I:4.

> product or output. The input or process has to be considered, too, to determine whether there are ways in which the process could be improved so as to get a greater or better product.

Domains of educational objectives with reference to evaluation were grouped by Hagen and Thorndike into (1) structural objectives, (2) process objectives, and (3) product objectives.[23] By structure they referred to the school plant, equipment, and formal organization. Process is concerned with school and classroom procedures. Product referred to the performance of a student. They asserted that evaluations of schools have moved to "self-evaluations" which are toward the structure and process domains and have by-passed the product domain.

When evaluations are based only on the structure and process domains, an assumption must be made that certain structure and/or processes will, in fact, produce the desired end products.[24] Coster and Ihnen make the following statement concerning this assumption:[25]

> Evaluative criteria and accreditation are based on a tacit assumption of high correlation between the process and product of vocational education. There is little or no evidence that the assumption of correlation between process and product variables is valid.

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[23]Hagen and Thorndike. loc. cit., pp. 482-85

[24]Ibid., pp. 482-85

[25]John Coster and Loren A. Ihnen. "Program Evaluation." Review of Educational Research. 38: 429-30. Oct. 1968.

Byram and Robertson state further that, "Most accreditation and state evaluations of local programs have placed considerable emphasis on the ways and means of conducting the programs. These approaches have involved setting up standards to be met, and determining how nearly a school program measures up to them and/or how a given program compares with others in the state."[26] Examples of such plans are those prepared by departments of education in Pennsylvania, Connecticut, and Florida.[27]

Reynolds, Grobman, and McGee developed a manual which could be used to evaluate all areas of vocational education.[28] Their system was designed so that it could be administered either as a state department instituted evaluation or a self-evaluation by the staff of the local school. The system outlined procedures to follow, but also permitted adjustment to local conditions.

Daniels developed a document which contained suggestions for determining evaluative criteria, use of

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[26]Byram and Robertson. op. cit., p. I:4.

[27]Pennsylvania Department of Public Instruction. "Instrument for Evaluating a Department of Vocational Agriculture." (University Park, Pennsylvania. 1965.) pp. 1-12.; Connecticut Department of Education. "Criteria for Evaluation of Vocational Technical Schools of Connecticut." (Hartford, Connecticut. 1966.) pp. 1-205.; and Florida State Department of Education. "Accreditation Standards for Florida." (Tallahassee, Florida. 1967.) pp. 1-14.

[28]Reynolds, Grobman, and McGee. op. cit., pp. 1-135.

self-reports, rating scales, and processes of observation and evaluation. It was designed to "delineate the conditions under which statewide programs measure and evaluate teaching."[29]

Addison, Anderson, and Johnson developed a self-evaluation instrument designed especially for business and office education.[30] It placed stress on the processes of education in those two particular areas of vocational education. Such instruments, as well as similar plans and procedures for evaluation, seem to provide evidence for the following statement by Norton:[31]

> Past evaluations have focused almost entirely on the educational process -- curricular organization, staff activities and qualifications, and physical facilities while ignoring program inputs and program outcomes.

Product Evaluation

O'Connor declared that, "rapid changes in technology mandates continuous revision of technical instruction. Feedback of information from recently employed students

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[29]Fred Daniels. "The Measurement and Evaluation of Teaching: A Conceptualization of a Plan for use in State Educational Leadership." (Tallahassee: Florida State Department of Education. May 1967.) pp. 1-97.

[30]Robert Addison, Ester E. Anderson, and T. R. Johnson. "A Self-evaluation Instrument for the Business and Office Education Programs in Secondary Schools." (Columbus: Ohio State Department of Education. 1967.) pp. 1-40.

[31]Norton. op. cit., p. 1.

provides one of the best means of obtaining an evaluation of the relevance of course content, instructional emphasis, and student advisement to the actual demands of employment."[32]

According to Whinfield, the logical starting point in the evaluation of education is the "product" or student, and his or her subsequent experiences. This information should be obtained by a major tool of evaluation -- the follow-up study.[33]

A guide by the Wisconsin Board for Vocational, Technical, and Adult Education stated, "for research purposes, follow-up studies...should be viewed as components of a larger system of studies -- the evaluation of education."[34]

Ways that the information gathered by a follow-up of former students may be useful was also brought out in

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[32]Thomas O'Connor. "Follow-up Studies in Junior Colleges -- A Tool for Instructional Improvement." Washington D. C.: American Association of Junior Colleges. 1967.) p. 14.

[33]Richard W. Whinfield. "Review and Synthesis of Research on Placement and Follow-up of Vocational Education Studies." (paper presented at the 63rd Annual American Vocational Association Convention, Boston, Mass. 1969.) p. 3.

[34]Wisconsin Board of Vocational, Technical, and Adult Education. "Guidelines for Conducting Periodic Follow-up Studies." (Madison. 1970.) p. iv.

the Wisconsin guide. According to this publication such information should help:[35]

1. students in making career choices,
2. instructors in ascertaining effectiveness of teaching,
3. guidance counselors in counseling students,
4. instructional services supervisors in curriculum revision,
5. coordinators in program planning,
6. administrators in establishing program goals, and in evaluating results.

Placement and follow-up of former students should be built into any school program that includes preparation for work, according to Byram and McKinney.[36] Through those activities, they indicated that it was possible to evaluate the appropriateness of placement; the success of former students in their early full-time employment; the job satisfactions and adjustment concerns of former students; and the ideas presented for possible improvements in the program.

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[35] Ibid., p. iv.

[36] Harold Byram and Floyd McKinney. "Evaluation of Local Vocational Education Programs." Second edition. (East Lansing: College of Education, Michigan State University. 1968.) p. 20.

Whinfield reported three general categories of follow-up studies.[37]

1. administrative reports -- information gathered to describe the occupational status of graduates of specific educational programs.

2. comparative studies -- studies designed to compare graduates of differing types of educational programs in the same school, or within samples of schools in the same state, or within samples of schools drawn from many states.

3. cost-benefit -- studies which refine the analysis of occupational education, developing the types of information and research techniques to establish the effectiveness of vocational education.

Whinfield contended that simple quantitative or descriptive studies have limited usefulness for decision making.

A computer search using the DATRIX system[38] located a limited number of studies at the post-secondary level of vocational technical education. The DATRIX search revealed four studies which are relevant to post-secondary technical education. In one of these studies Armstrong considered the post-secondary needs of persons in Delaware County, New York.[39] He concluded that several kinds of post-secondary education programs were needed. These programs should be

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[37]Whinfield. op. cit., p. 3.

[38]University Microfilms. "DATRIX." Ann Arbor, Mi..

[39]James Albert Armstrong. "A Study of Formal Post-Secondary Educational Needs in Delaware County, New York, with Implications for the Role of the Agricultural and Technical Institute at Delhi." (unpublished Ed.D. thesis Columbia University. 1966.) (in Vol. 2907, p. 2048 of Dissertation Abstracts International.)

for local youth and range from short-term, intensive job-training, to new and expanded curricula at the associate degree level.

A follow-up procedure for data collection was used in the three other studies located through DATRIX. DeCora gathered occupational and educational data for the evaluation of on-going programs and for future planning.[40] He reported that the rates of entry into and persistence in employment fields for which alumni were prepared have continued to be high. Bowser gathered data concerning curriculum by a follow-up of graduates and dropouts.[41] He noted the following data concerning employment status of the alumni:

> 56 per cent worked in trades for which they were trained.
> 9 per cent worked in related trades or occupations.
> 31 per cent worked in non-related trades or occupations.
> 3.7 per cent were unemployed.

He also reported that alumni employed in trades for which

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[40]Paul J. DeCora. "A Study of the Post-Institute Occupations and Educational Experiences of Selected Alumni of State University Agricultural and Technical Institute at Farmingdale, New York." (unpublished Ed.D. thesis, Columbia University. 1963.) (in Vol. 2412A, p. 5119 of Dissertation Abstracts International.)

[41]James Albert Bowser. "Curriculum and Other Implications Resulting from a Study of the Graduates and Dropouts of the Terminal Vocational Industrial Education Program at the Norfolk Division of Virginia State College, 1950-54." (unpublished Ed.D. thesis. The Pennsylvania State University. 1960.) (in Vol. 2107A, p. 1803 of Dissertation Abstracts International.)

they were trained received higher salaries than those employed in non-related trades or occupations. Employment status and course needs were the main concerns of a follow-up study by Kushner.[42] He indicated that work performed initially by two-year graduates required no college training. Later these graduates progressed to positions equal to those held by employees with baccalaureate or graduate degrees. No reference was made to dropouts or graduates who did not take or remain in jobs for which they were prepared.

Dillon conducted a study to determine if separate and specialized agricultural courses are needed for workers in nurseries and for workers in ornamental horticulture businesses.[43] The data for the study were gathered by interviewing the general director, a salesman, a supervisor, and a field worker from twenty randomly selected nurseries and from twenty randomly selected ornamental horticultural businesses. He concluded that, "some basic courses and

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[42]John Kushner. "Study of the Positions, Subject Needs, and Level of Work of the Technology Graduates of Bromme Technical Community College." (unpublished Ed.D. thesis. Cornell University. 1965.) (in Vol. 2609A, p. 5163 of Dissertation Abstracts International.)

[43]Roy Dillon. "Comparison of Certain Abilities Needed by Workers in Licensed Nurseries and Licensed Ornamental Horticulture Businesses." (Division of Applied Arts. Morehead State University, Kentucky. March 1965.) p. 26.

some specialized courses were needed in the four types of jobs in both businesses."[44]

Wood studied the influence of five post-high school agricultural programs to determine the success of the students when employed.[45] Information was collected from students, graduates, and employers. Of the five schools, only one had graduates at the time of the study. Excluding those in military service, 11.5 per cent of the graduates were employed outside of agriculture. One-third of the graduates were working for firms related to agriculture and one-fourth were continuing their education in agriculture. Wood asked the employers to rate the graduates in their employ on twelve personality factors. Their ratings are reported in Table I. The employers also rated the graduates above the average of their other beginning employers.

A study conducted in Wisconsin by Little and Whinfield was concerned with graduates of vocational,

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[44] Ibid., p. 26.

[45] Eugene Wood. "An Evaluation of Illinois Post-High School Educational Program in Agriculture." (School of Agriculture, Southern Illinois University, Carbondale. September 1967.) pp. 1-32.

technical, and adult programs.[46] Agriculture programs were not included in the study. It was found that 81 per cent of the graduates were in jobs related to the area for which they had been trained.

TABLE I

NUMERICAL RANKING OF TWELVE PERSONALITY TRAITS BY EMPLOYERS OF FORMER STUDENTS OF AGRICULTURAL TECHNICIAN PROGRAMS AS REPORTED IN THREE STUDIES

Personality Traits	Wood	Becker	Iverson, et. al.
Integrity	1.5	1.0	1.0
Dependability	1.5	4.0	5.0
Cooperation	3.0	6.0	2.0
Responsibility	4.0	4.0	7.5
Courtesy	5.5	2.0	3.5
Appearance	5.5	4.0	3.5
Attitude Toward Work	7.5	7.0	9.0
Emotional Stability	7.5	8.5	6.0
Potentialities	9.0	8.5	7.5
Initiative	10.5	11.0	11.5
Judgment	10.5	10.0	10.0
Leadership	12.0	12.0	11.5

[46]Kenneth J. Little and Richard W. Whinfield. "Follow-up of 1965 Graduates of Wisconsin Schools of Vocational, Technical, and Adult Education." (Center for Studies in Vocational and Technical Education, University of Wisconsin. Madison. June 1970.) pp. 1-44.

In three studies by Wood[47], by Becker[48], and by Iverson and Bender[49], employers rated former students of technical programs, in their employ, on twelve personality traits. Table I, presents a numerical ranking of the twelve personality traits. Integrity was rated first and initiative, judgment, and leadership were in the last three rankings in the three studies.

Christensen considered student characteristics and factors related to academic success in an associate degree program. He did not separate graduates, dropouts, and currently enrolled students in the analysis. Cited as reasons for students leaving the program were a lack of interest in the program, a feeling of not accomplishing their objectives, a lack of money, and a need to be at home.[50]

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[47] Ibid., p. 1-32.

[48] William J. Becker. "Technical Agriculture Programs in Ohio With Emphasis Upon Student and Program Characteristics." (unpublished Ph.D. thesis. The Ohio State University. Columbus. 1968.) p. 187.

[49] Maynard J. Iverson and Ralph E. Bender. "Agricultural Technician Education in Ohio -- 1969-70." (a research report of a graduate study. Columbus: The Ohio State University. February 1971.) p. 57.

[50] Harold H. Christensen. "Student Characteristics and Factors Related to Success in the Associate Degree Program in Agriculture, University of Nevada, Reno, 1965 to 1970." (Reno: College of Agriculture, University of Nevada. 1971.) p. 8.

Rosenfeld directed a project to develop objectives and follow-up instruments.[51] The objectives and follow-up instruments were developed by Rosenfeld and his staff and were reviewed and revised by the staff of Greene Joint Vocational School. While the instruments appear to be well planned, no results were presented which would test the adequacy of the instruments.

Studies of former students in the past, have focused upon graduates from vocational-technical education programs, but little research has been done on dropouts from these programs. Norton states, "if the evaluation effort is to be geared to provide diagnostic information about the strengths and weaknesses of existing programs...then we must obtain feedback from all whom the programs are designed to serve and not just the successful graduate."[52]

Becker[53] and later, Iverson and Bender[54] collected some data concerning the dropouts. Both studies found the approximate annual salary to be $5,000. The reasons for withdrawing from the technical programs were

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[51]Michael Rosenfeld. "An Evaluation Plan for the Greene Joint Vocational School." (American Institute for Research in Behavioral Sciences, Pittsburg, Pennsylvania. 1967.)

[52]Norton. op. cit., p. 5.

[53]Becker. op. cit., pp. 153-176.

[54]Iverson and Bender. op. cit., p. 77.

dissatisfaction with the program, lack of money, low grades, parents' advice, draft, taking a job, enrollment in another school, and marriage.

Becker described the present status of the graduates of the technical agricultural program. His findings showed 88 per cent of the graduates were employed in agriculture or enrolled in an agricultural college.[55] According to Iverson and Bender nearly 50 per cent of the 1969 graduates of agricultural technician programs were employed in agriculture.[56]

Becker[57] and Iverson and Bender[58] attempted to determine the job satisfaction of the graduates. Their findings are reported below:

	Becker	Iverson & Bender
	%	%
Very Satisfied	52	21
Satisfied	39	50
Dissatisfied	9	29
Very Dissatisfied	-	-

The average annual salaries of graduates ranged from $5,400 reported in 1968 to $5,800 in 1970, to $6,300 reported in 1971.[59]

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[55]Becker. op. cit., p. 149.

[56]Iverson and Bender. op. cit., p. 39.

[57]Becker. op. cit., p. 157.

[58]Iverson and Bender. op. cit., p. 47.

[59]Becker. op. cit., p. 153; Little and Whinfield, op. cit., p. 40; and Iverson and Bender. op. cit., p. 46.

CHAPTER III

METHODOLOGY

This study is concerned with an evaluation of the Landscape and Nursery Technician program at Michigan State University. The evaluation was conducted by a follow-up study of former students of the program and of those landscape and nursery employers who hired many of the former students.

The population, the methods used to gather the data, and the statistical treatments applied to the data are presented in this chapter.

Population

The population of this study consisted of former students of the Landscape and Nursery Technician program, Institute of Agricultural Technology, Michigan State University. To be included in the population, the students must have completed at least one term of the program and have been scheduled to graduate or they did graduate in 1966, 1967, 1968, 1969, or 1970.

Attempts were made to contact by telephone each of the individuals or their parents in the case of those in military service. One hundred-sixty two were contacted and constitute the accessible population for this study.

These former students are categorized in Table II.

TABLE II

FORMER STUDENT POPULATION

Population	Number	Per cent of Accessible Population
Accessible Population		
Employed	110	67.90
College Student	24	14.82
Military	21	12.96
Unemployed	7	4.32
	162	100.00
Unaccessible Population		
Impossible to contact	11	
Deceased	5	
	16	

The names and addresses of employers of former students in the landscape and nursery industry were obtained from the former students who work for them. The employer population for the study is thirty-eight.

Sources of Data

The records in the offices of the director of the Institute of Agricultural Technology and of the coordinator of the Landscape and Nursery Technician program, telephone interviews with the former students, and two mailed survey instruments were used to collect data for this study.

Instruments. Two survey instruments were prepared, one for the former students[1] and one for the employers[2]. The instruments were developed by a review of relevant literature and by consultation with the researcher's doctoral committee, members of the staff of the Institute of Agricultural Technology, and the faculty of the Department of Horticulture, Michigan State University.

After development, the instruments were submitted to a jury consisting of five second year students in the Landscape and Nursery Technician program and one representative from each of five different phases of the landscape and nursery industry in Michigan.[3] The coordinator of the Landscape and Nursery Technician program recommended the persons who were asked to serve on the jury. They were asked to examine the instruments for clarity of directions to respondents and completeness and clarity of the items.

The instrument which was used to gather responses from former students contained a section on personal data and a section concerning competencies. The personal section was in two parts with questions patterned after those developed by O'Connor.[4] The first part contained questions related to graduation or withdrawal from the program and to

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[1]Appendix B [2]Appendix C [3]Appendix D

[4]Thomas O'Connor. "Follow-up Studies in Junior Colleges -- A Tool for Instructional Improvement." (Washington, D. C.: American Assn. of Junior Colleges, 1967.) pp. 54-74.

continuing education. The questions asked of each individual depended upon whether he graduated or withdrew from the program and whether he continued his education in a different technical program or at another institution. The second part of the personal data section was applicable to all former students.

The section of the instrument concerning competencies was sent to those employed in the landscape and nursery industry, but not to other former students. This section was developed by adapting an instrument prepared by Dillon.[5] Competencies pertaining to floriculture in Dillon's list were not appropriate to this study. The remaining competencies were combined by the researcher and the coordinator of the Michigan State University Landscape and Nursery Technician program to form a list of fifty-five selected comptetncies which should have been acquired by graduates of the Landscape and Nursery Technician program.[6] Three questions were to be answered concerning each competency.

1. How important is this skill for your present job?
2. Where did you learn most about this skill?
3. How would you evaluate your ability to perform this skill?

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[5]Roy Dillon. "Comparison of Certain Abilities Needed by Workers in Licensed Nurseries and Licensed Ornamental Horticulture Businesses." (Division of Applied Arts, Morehead State University, Kentucky. March 1965.) pp. 33-39.

[6]Appendix B.

Questions 1 and 3 were answered by use of a Likert-type scale. Kerlinger indicated that Likert-type scales or summated rating scales are those in which responses are independent.[7] By independence he is suggesting that a person's response to an item has no influence on his response to another item. Along with the factor of independence, this type of scaling permits more precise measurement of the intensity of responses resulting in greater attitude variance. Kerlinger also pointed out one serious disadvantage which he referred to as response-set. Response-set confounds the attitude variance. Despite this disadvantage Kerlinger stated in comparing this method to the other methods of scaling:[8]

> ...the summated rating scale seems to be the most useful in behavioral research. It is easier to develop, and ...yields about the same results as the more laboriously constructed, equal-appearing interval scale. Used with care and knowledge of its weaknesses, summated rating scales can be adapted to many needs of behavioral researchers.

A list of six alternatives was provided as possible answers to Question 2. A copy of the complete questionnaire is in Appendix B.

After the instrument for the former students had been developed and approved by the jury, a telephone

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[7]Fred Kerlinger. Foundations of Behavioral Research. (New York: Holt, Rinehart, and Winston, Inc. 1964.) pp. 484-493.

[8]Ibid.

interview schedule was developed to secure basic information including address, employment status, employer's address (if an employer in the landscape and nursery industry), additional education completed, and military status.[9] These data allowed the researcher to send only those questions which applied to each individual rather than sending the entire instrument. The telephone interview was also used as a means of personal contact. It was assumed that a personal contact with each individual would increase the per cent of responses. Kerlinger indicated that, "responses to mailed questionnaires are generally poor. Returns of less than 40 or 50 per cent are common. Higher percentages are rare. At best, the researcher must content himself with returns as low as 50 or 60 per cent."[10]

The employer survey instrument contained two sections. The first section was patterned after Wood.[11] Employers were asked to rate personality traits of former students in their employ. They were also asked to rate the quantity and quality of the work of these former students. Their ratings utilized a Likert-type scale. The twelve personality traits

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[9]Appendix E.

[10]Kerlinger, op. cit., p. 397.

[11]Eugene Wood. "An Evaluation of Illinois Post-High School Education Programs in Agriculture." (School of Agriculture, Southern Illinois University, Carbondale. September 1967.) Appendix D.

were integrity, dependability, responsibility, initiative, judgment, cooperation, leadership, attitudes toward work, emotional stability, courtesy and friendliness, personal appearance, and potentialities.[12] The advantages and disadvantages of the Likert scale, pointed out when describing how the survey instrument for former students was developed, were also considered while developing the questionnaire which was mailed to employers.

The list of fifty-five selected competencies in the second section of the employer instrument was identical to the list used in the instrument mailed to former students.[13] The employers were to answer two questions concerning each competency:

1. How important is this skill to the employee's present job?
2. How would you evaluate his ability to perform this skill?

Both questions were answered by use of Likert-type scales identical to those used while securing responses from former students, thus allowing for direct comparison of the responses. The purposes of the competency list were to determine the perceived importance of the competencies to the former student and his ability to perform those competencies.

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[12] Appendix C.

[13] Ibid.

Gathering the Data. An attempt was made to telephone former students or the parents of those in military service to complete the interview schedule. After the interview schedule was completed, a cover letter signed by the researcher and the coordinator of the Landscape and Nursery Technician program,[14] together with the appropriate parts of the instrument, were mailed to the former students. A stamped and addressed envelope was enclosed for the convenience of the respondents when returning the inquiry form. If the former student was a persister, an employer instrument along with a cover letter was also sent to his employer.[15]

A printed postal card was used to acknowledge receipt of completed instruments and to remind the non-respondents to complete and return the questionnaires.[16] Ten days after mailing the instruments, the postal card reminder was sent to all non-respondents. If the completed instruments were not returned after ten days, the non-respondents, both former students and employers, were called by telephone to seek their participation. No further attempts were made to secure additional responses.

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[14]Appendix F.

[15]Ibid.

[16]Appendix G.

Processing of Data

The data were tabulated and measures of central tendency and percentages were calculated with the use of a desk calculator.

While 82.1 per cent of the accessible population responded, it seemed desirable to determine if those responding to the mailed questionnaire were significantly different from the non-respondents. Certain basic information obtained by the telephone interview was available on all individuals of the accessible population. This information related to graduation or withdrawal from the Institute, employment status, further education, and military service. These data were tested by the chi-square statistic to determine if significant differences existed in the responses of the two groups. At the .05 level, no significant differences existed between respondents and non-respondents on these four factors.[17] Based on these findings, it is assumed that the respondents are representative of the total accessible population of the study.

The three hypotheses presented in Chapter I, were stated in the null form and statistically tested. The raw data necessary for the tests were transferred to data processing cards to facilitate the statistical analysis. The Office of Research Consultation, College of Education,

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[17]Appendix H.

Michigan State University, recommended statistical tests and the programs which perform the tests on the CDC 3600 computer in the Computer Center, Michigan State University.

Hypothesis 1: (null form) There are no significant differences in job satisfaction, salary, or job stability among:

A. Persistent dropouts
B. Persistent graduates
C. Non-persistent dropouts
D. Non-persistent graduates

Job satisfaction, salary, and job stability were related to these categories of former students through the test of analysis of variance using the CDC 3600 computer Finn program.[18]

Hypotheses 2 and 3: (null forms) 2. There are no significant differences in the perceived importance of selected competencies as rated by persistent former students and employers.

3. There are no significant differences in the ratings of persistent former students and their employers on the abilities of the persistent former students to perform the selected competencies.

The Pearson product-moment correlation statistic as calculated by the Missing-Data Stat Program (MDSTAT) on

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[18]Jeremy D. Finn. "Univariate and Multivariate Analysis of Variance and Covariance." Occasional Paper No. 9. (East Lansing: Office of Research Consultation, Michigan State University. March 1970.) pp. 1-19. (Mimeo.)

on the CDC 3600 computer was used to determine the correlations between:[19]

1. the perceived importance of selected competencies as rated by persistent former students and employers.
2. the perceived abilities of persistent former students to perform selected competencies as rated by persistent former students and employers.

By use of a transformation subroutine with the MDSTAT program, it was possible to create four new variables.[20] Two of the new variables represented weighted abilities: [WA = A(I), product of numerical rating on ability to perform and rating of importance of competency]. One weighted ability variable was determined from the responses of persistent former students, and a second weighted ability was determined similarly from the employers' responses.

The two remaining new variables were difference scores. One was the difference between the ratings as given by the persistent former students and their employers concerning the importance of the selected competencies. The second was the difference in the ratings of persistent former students and their employers on the abilities of

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[19]Agricultural Experiment Station. "MDSTAT." STAT Series Description No. 6. (East Lansing: Michigan State University. January 1966.) pp. 1-8. (Mimeographed)

[20]Agricultural Experiment Station. "Data Transformation." STAT Series Description No. 19. (Michigan State University, East Lansing. January 1966.) pp. 1-45. (Mimeographed)

the persistent former students to perform the selected competencies.

To test for significant differences across all pairs, the data for each difference variable were summed and squared by use of a desk calculator. The data were tested for difference between means by use of the Student's *t* statistical test.

CHAPTER IV

PRESENTATION OF FINDINGS AND ANALYSIS OF DATA

The purpose of this study is to evaluate the Landscape and Nursery Technician program, Institute of Agricultural Technology, Michigan State University. The data presented in this chapter were gathered by a follow-up of former students of the program and of those landscape and nursery employers who hired many of the former students.

Population

To be included in this study, the former students must have been scheduled to graduate in 1966, 1967, 1968, 1969, or 1970; therefore, all except one student entered the program in 1964, 1965, 1966, 1967, or 1968. Because of previous education,one student entered the program in 1969 and completed requirements for graduation in 1970.

Altogether, 178 former students of the Landscape and Nursery Technician program met the requirements to be included in this study. Due to the death of five former students and eleven who could not be located, the accessible population for the study consisted of 162 former students. Their names and addresses are listed in Appendix I. Former students who were employed in the landscape and nursery industry and former students who were

enrolled in a horticulture or landscape architecture program other than the Landscape and Nursery Technician program were considered persisters. Former students in the military service, but who entered the service from either the status of a student or an employee in the landscape and nursery fields, were also considered to be persisters.

Non-persistent former students were those former students not employed in the landscape and nursery industry and former students not enrolled in a horticultural or landscape architecture program. Former students in the military service, but who entered the service from either the status of a student or an employee in an occupation other than in the landscape and nursery field, were also considered to be non-persisters.

Data presented in Table III, reveal the number of students entering the program each year from 1964 to 1970, while data in Table IV, indicate the year these students graduated or withdrew from the program. No definite trends regarding the numbers of students, either entering or leaving the program, can be observed.

From the records in the offices of the director of the Institute and the coordinator of the Landscape and Nursery Technician program, the extent of participation in placement training was determined. As can be seen in Table V, the largest number of individuals not participating were in the non-persistent dropout category.

TABLE III

YEAR FORMER STUDENTS ENTERED THE LANDSCAPE AND NURSERY TECHNICIAN PROGRAM

Year	Former Student Categories								Total	
	Persistent Dropouts		Persistent Graduates		Non-persistent Dropouts		Non-persistent Graduates			
	N	%	N	%	N	%	N	%	N	%
1964	1	4.00	11	18.64	7	16.28	9	25.71	28	17.28
1965	3	12.00	18	30.51	6	13.95	9	25.71	36	22.22
1966	5	20.00	9	15.25	10	23.26	6	17.15	30	18.52
1967	8	32.00	10	16.95	7	16.28	3	8.57	28	17.28
1968	8	32.00	10	16.95	13	30.23	8	22.86	39	24.08
1969	-	-	1	1.70	-	-	-	-	1	.62
1970	-	-	-	-	-	-	-	-	-	-
Total for Category	25	100.00	59	100.00	43	100.00	35	100.00	162	100.00

TABLE IV

YEAR FORMER STUDENTS COMPLETED OR WITHDREW FROM THE LANDSCAPE AND NURSERY TECHNICIAN PROGRAM

Year	Former Student Categories								Total	
	Persistent Dropouts		Persistent Graduates		Non-persistent Dropouts		Non-persistent Graduates			
	N	%	N	%	N	%	N	%	N	%
1964	1	4.00	-	-	5	11.62	-	-	6	3.70
1965	1	4.00	-	-	5	11.62	-	-	6	3.70
1966	2	8.00	9	15.25	7	16.28	10	28.57	28	17.28
1967	7	28.00	18	30.51	8	18.53	8	22.86	41	25.31
1968	8	32.00	11	18.64	9	20.93	6	17.14	34	20.99
1969	4	16.00	9	15.25	6	13.95	4	11.43	23	14.20
1970	2	8.00	12	20.35	3	7.07	7	20.00	24	14.82
Total for Category	25	100.00	59	100.00	43	100.00	35	100.00	162	100.00

TABLE V

PARTICIPATION IN PLACEMENT TRAINING
BY FORMER STUDENTS

Former Student Categories	Participation		Non-participation		Total
	N	%	N	%	N
Persistent Dropouts	13	52.00	12	48.00	25
Persistent Graduates	59	100.00	-	-	59
Non-persistent Dropouts	12	28.00	31	72.00	43
Non-persistent Graduates	35	100.00	-	-	35
Totals	119	73.46	43	26.54	162

Forty-one persistent former students, employed full-time, provided the names and addresses of their employers. Thirty-eight of these persisters were employed in positions with someone working above them who had knowledge of the requirements of their jobs. The other three persisters worked on jobs such that no one above them had the specific knowledge needed to complete an employer's questionnaire for each of these three employees. Thirty or 78.9 per cent of the employers returned questionnaires relating to former students now in their employ. The names and addresses of the employers are listed in Appendix J.

Telephone Interviews

Each of the former students was interviewed by telephone to obtain certain basic information, including address, employment status, employer's address (if an employer in the landscape and nursery industry), additional education completed, and military status.

The employment statuses of the former students, as determined by the telephone interviews, are given in Table VI. This information along with graduation or withdrawal data, secured from official records, made it possible to divide the former students into categories.

As indicated in Table VII, the largest number, fifty-nine or 36.42 per cent, of former students are categorized as persistent graduates. The three remaining categories in order are non-persistent dropouts, forty-three or 26.54 per cent; non-persistent graduates, thirty-five or 21.61 per cent; and persistent dropouts, twenty-five or 15.43 per cent.

Regrouping the accessible population according to persistence in the landscape and nursery industry, reveals that eighty-four or 52 per cent are persisters and seventy-eight or 48 per cent are non-persisters. If the population is regrouped according to education ninety-four or 58 per cent graduated and sixty-eight or 42 per cent withdrew from the landscape and nursery technician program.

TABLE VI

EMPLOYMENT STATUSES OF FORMER STUDENTS

Employment Statuses of Persisters and Non-persisters	Dropouts		Graduates		Total for Employment Status	
	N	%	N	%	N	%
Persisters						
Self-employed	3	12.00	11	18.64	14	8.64
Full-time employment	11	44.00	30	50.85	41	25.31
Part-time employment	-	-	-	-	-	-
College student	6	24.00	8	13.56	14	8.64
In military service	5	20.00	10	16.95	15	9.26
Total	25	100.00	59	100.00	84	51.85
Non-persisters						
Self-employed	-	-	-	-	-	-
Full-time employment	30	69.77	23	65.72	53	32.72
Part-time employment	-	-	2	5.71	2	1.23
College student	4	9.30	6	17.15	10	6.17
In military service	4	9.30	2	5.71	6	3.71
Unemployed	5	11.63	2	5.71	7	4.32
Total	43	100.00	35	100.00	78	48.15

TABLE VII

CATEGORIES OF FORMER STUDENTS

Former Student Categories	N	Per Cent of Population
Persistent Dropouts	25	15.43
Persistent Graduates	59	36.42
Non-persistent Dropouts	43	26.54
Non-persistent Graduates	35	21.61
Total	162	100.00

As shown in Table VI, 108 or 66.67 per cent of the former students were either self-employed or engaged in other full-time employment. In addition, two non-persisters were employed part-time. Thus, the former students, who were employed either full or part time, totaled 110. They represented 67.90 per cent of the 162 former students included in this study. Of the former students, twenty-four or 14.81 per cent attend college and twenty-one or nearly 13 per cent serve in the military.

Seven or 4.32 per cent of the former students are unemployed. By way of comparison, the United States Department of Labor reported that the rate of unemployment of non-farm workers during the first quarter of 1971 was 3.6 per cent for white collar workers and 7.5 per cent for blue collar workers.[1] The rate for farm workers during the same

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[1]United States Department of Labor. "Monthly Labor Review." (Washington, D. C.: Bureau of Labor Statistics, June 1971.) p. 107.

period was 2.9 per cent. Most of the former students are in the 20 to 24 year age bracket. In March 1971, the Department of Labor reported that the unemployment rate in this age bracket was 10.00 per cent.[2]

During the telephone interview former students were asked if they had participated in additional education after leaving the Landscape and Nursery Technician program. As shown in Table VIII, sixty-seven or 41.36 per cent of the former students did continue in some form of education after leaving the Landscape and Nursery Technician program. The persistent graduates did not participate in additional education after leaving the program to the extent of the three other categories of former students.

TABLE VIII

PARTICIPATION IN ADDITIONAL EDUCATION AFTER WITHDRAWAL OR GRADUATION FROM THE LANDSCAPE AND NURSERY TECHNICIAN PROGRAM

Former Student Categories	Participation		Non-participation		Total
	N	%	N	%	N
Persistent Dropouts	12	48.00	13	52.00	25
Persistent Graduates	17	28.81	42	71.19	59
Non-persistent Dropouts	21	48.84	22	51.16	43
Non-persistent Graduates	17	48.57	18	51.43	35
Totals	67	41.36	95	58.64	162

[2] Ibid., p. 108.

The military statuses of the former students are shown in Table IX. The largest per cent of them carry some type of deferment from military service. The group listed as "not applicable" includes two women and two foreign students.

Questionnaire Responses

Following the telephone interview, a questionnaire was mailed to each former student. The questionnaire supplemented the information received from the telephone interviews by providing additional personal data, reactions to the Landscape and Nursery Technician program, and reactions to competencies needed in the landscape and nursery industry.

Responses were received from 133 former students or 82.1 per cent of the 162 who were mailed questionnaires. Table X reveals the distribution of the respondents among four categories of former students.

It is interesting to note that the persistent dropouts and graduates responded at the same rate while the non-persistent dropouts and graduates responded at approximately the same rate, but over 10 per cent lower than those who persisted in the landscape and nursery industry.

To determine if the non-respondents were significantly different from the respondents, data obtained from the telephone interviews were tested by the chi-square

TABLE IX

MILITARY STATUSES OF FORMER STUDENTS

Military Statuses	Persisters				Non-persisters				Total	
	Dropouts		Graduates		Dropouts		Graduates			
	N	%	N	%	N	%	N	%	N	%
Veteran	6	24.00	10	16.95	11	25.58	8	22.86	35	21.61
In military service	5	20.00	10	16.95	4	9.30	2	5.71	21	12.96
Eligible for draft	1	4.00	8	13.56	4	9.30	6	17.14	19	11.73
Deferred	8	32.00	23	38.98	21	48.84	16	45.72	68	41.98
In Guard/Reserves	3	12.00	7	11.86	2	4.65	3	8.57	15	9.26
Not Applicable	2	8.00	1	1.70	1	2.33	-	-	4	2.46
Total	25	100.00	59	100.00	43	100.00	35	100.00	162	100.00

TABLE X

RESPONSES TO QUESTIONNAIRE BY
FORMER STUDENT CATEGORIES

Categories	Population N	Respondents N	Per Cent Responses	Non-respondents N
Persistent Dropouts	25	22	88.00	3
Persistent Graduates	59	52	88.14	7
Non-persistent Dropouts	43	32	74.42	11
Non-persistent Graduates	35	27	77.14	8
Total	162	133	82.10	29

statistic. At the .05 level, no significant differences existed between respondents and non-respondents on the factors of graduation or withdrawal from the program, employment status, additional education, and military service as indicated by the data in Appendix H. These findings indicate that the respondents are representative of the total accessible population. As mentioned previously in this chapter, thirty of thirty-eight or 78.9 per cent of the employers responded to a questionnaire.

Reasons For Withdrawing From The Program

In Tables XI and XII, the reasons are listed which the dropouts gave for withdrawing from the Landscape and Nursery Technician program. According to data in Table XI, the principal reason for withdrawal given by former students who did not continue their education was low grades. While this is the reason given most frequently, it represents less than 50 per cent of all responses. One former student, a non-persistent dropout, responded in the "other" category by indicating he had "uncertain goals".

The reasons which former students gave for withdrawal from the Landscape and Nursery Technician program to continue their education under some other program are summarized in Table XII. "Planned to transfer to another college" is the reason which the former students reported most frequently.

TABLE XI

REASONS FOR WITHDRAWAL FROM THE PROGRAM OF FORMER STUDENTS WHO DID NOT CONTINUE THEIR EDUCATION

Reasons for Withdrawing	Persisters		Non-persisters		Total	
	N	%	N	%	N	%
You lost interest in further education.	-	-	-	-	-	-
You were asked to withdraw because of low grades.	3	30.00	9	56.25	12	46.15
You had personal problems.	1	10.00	-	-	1	3.85
You obtained full-time employment.	1	10.00	-	-	1	3.85
You felt the training you desired had been completed.	2	20.00	-	-	2	7.69
You developed an interest in a field other than the landscape and nursery industry.	-	-	3	18.75	3	11.53
You had inadequate financial support.	1	10.00	1	6.25	2	7.69
You entered the military.	1	10.00	1	6.25	2	7.69
You developed a serious illness.	1	10.00	-	-	1	3.85
You married.	-	-	1	6.25	1	3.85
You planned to transfer to another college.	-	-	-	-	-	-
Other	-	-	1	6.25	1	3.85
Totals	10	100.00	16	100.00	26	100.00

TABLE XII

REASONS FOR WITHDRAWAL FROM THE PROGRAM OF FORMER STUDENTS WHO DID CONTINUE THEIR EDUCATION

Reasons for Withdrawing	Persisters		Non-persisters		Total	
	N	%	N	%	N	%
You lost interest in further education.	-	-	1	6.25	1	3.57
You were asked to withdraw because of low grades.	1	8.34	4	25.00	5	17.86
You had personal problems	-	-	2	12.50	2	7.14
You obtained full-time employment.	-	-	-	-	-	-
You felt the training you desired had been completed.	-	-	-	-	-	-
You developed an interest in a field other than the landscape and nursury industry.	-	-	4	25.00	4	14.29
You had inadequate financial support.	1	8.33	-	-	1	3.57
You entered the military.	1	8.33	-	-	1	3.57
You developed a serious illness.	-	-	-	-	-	-
You married.	-	-	-	-	-	-
You planned to transfer to another college.	9	75.00	5	31.25	14	50.00
Other	-	-	-	-	-	-
Totals	12	100.00	16	100.00	28	100.00

It is interesting to note in Tables XI and XII that, even though no one, among the former students who did not continue their education, offered, "lost interest in further education", as a reason for leaving the program, one respondent, among the former students that withdrew to continue their education in another program, indicated this as a reason for withdrawal.

Fourteen or 50 per cent of the former students who did continue their education after withdrawal from the program did so because they planned to transfer to another college. Among the remaining fourteen who did not complete the Landscape and Nursery Technician program, five former students withdrew because of low grades, yet they continued their education in another educational program. Four of them withdrew because they developed an interest in a field other than the landscape and nursery industry and two withdrew because of personal reasons.

The former students were asked to indicate how their experience in the Landscape and Nursery Technician program had been most helpful to them. As shown in Table XIII, persistent graduates and dropouts did not agree on the experiences which had been most helpful. Twenty-four or 46.15 per cent of the graduates considered that obtaining a clear understanding of occupational requirements and opportunities had been most helpful, while five or 22.72 per cent of the dropouts indicated this to be the most

TABLE XIII

HOW COLLEGE EXPERIENCE WAS MOST HELPFUL
TO PERSISTENT FORMER STUDENTS

How college experience was most helpful.	Persisters				Total	
	Dropouts		Graduates			
	N	%	N	%	N	%
You obtained a clearer understanding of your abilities and goals.	4	18.18	10	19.23	14	18.92
You obtained a clearer understanding of occupational requirements and opportunities.	5	22.72	24	46.15	29	39.19
You received the training necessary to get a job in the field of your choice.	1	4.55	9	17.31	10	13.51
You received the encouragement, challenge, and sense of success necessary for you to continue your education.	8	36.36	5	9.62	13	17.57
Through a particular course or group of courses, you discovered a new field.	1	4.55	3	5.77	4	5.41
You learned how to get along with people.	1	4.55	-	-	1	1.35
Other response.	2	9.09	1	1.92	3	4.05
Response omitted.	-	-	-	-	-	-
Totals	22	100.00	52	100.00	74	100.00

helpful. Providing the encouragement, challenge, and sense of success necessary to continue their education rated as the principal way the program was most helpful to 36.36 per cent of the dropouts. Just over 9 per cent of the graduates indicated this response. Based on percentages, approximately 19 per cent of the dropouts and the graduates indicated that the opportunity to obtain a clearer understanding of their abilities and goals was the most help to them. As might be expected, a higher per cent of the graduates, 17.31 per cent, than dropouts, 4.55 per cent, indicated "received training necessary to get a job" as the most helpful aspect of the program.

Table XIV reveals the way that the college experience was most helpful to non-persistent former students. Twelve or 37.50 per cent of the dropouts considered the experience of obtaining a clearer understanding of their abilities and goals most helpful. Seven or 21.87 per cent of the dropouts considered the opportunity to discover a new field through a course or group of courses to be most helpful.

The non-persistent graduates were more evenly divided in their responses. Eight of the graduates indicated that the experience of receiving encouragement, challenge, and a sense of success had been most helpful, seven chose the experience of obtaining a clearer understanding of occupational requirements and opportunities as most helpful, five

TABLE XIV

HOW COLLEGE EXPERIENCE WAS MOST HELPFUL
TO NON-PERSISTENT FORMER STUDENTS

How college experience was most helpful.	Non-persisters				Total	
	Dropouts		Graduates			
	N	%	N	%	N	%
You obtained a clearer understanding of your abilities and goals.	12	37.50	5	18.52	17	28.81
You obtained a clearer understanding of occupational requirements and opportunities.	4	12.50	7	25.93	11	18.64
You received the training necessary to get a job in the field of your choice.	1	3.13	2	7.41	3	5.09
You received the encouragement, challenge, and sense of success necessary for you to continue your education.	2	6.25	8	29.63	10	16.95
Through a particular course or group of courses, you discovered a new field.	7	21.87	4	14.81	11	18.64
You learned how to get along with people.	4	12.50	-	-	4	6.78
Other response.	-	-	-	-	-	-
Response omitted.	2	6.25	1	3.70	3	5.09
Totals	32	100.00	27	100.00	59	100.00

selected the opportunity to obtain a clearer understanding of their college experience and four favored the opportunity to discover a new field through a particular course or group of courses as most helpful to them. As one might expect, only two of the graduate non-persisters selected the experience of receiving training necessary to get a job in the field of their choice as most helpful.

Ways the program could have been more helpful to former students are listed in Table XV for persisters, and in Table XVI for non-persisters. "A wider range of courses could be offered", received the most responses from both categories of former students. Eighteen graduates indicated that more supervision and guidance while on placement training could have been more helpful. Noteworthy is the fact that nearly 26 per cent of the non-persistent graduates responded to this item. Fourteen or approximately 10 per cent of the former students indicated that more supervision and guidance in classwork could be offered. Twenty per cent of the persisters and nearly twenty-two per cent of the non-persistent dropouts indicated that there should be more helpful guidance in choice and explanation of courses. Responses in the "other" category included "higher standards"; "more contact with industry people"; "better counselor relations"; "tougher courses"; "less liberal arts"; and three unrelated responses.

TABLE XV

HOW PROGRAM COULD HAVE BEEN MORE HELPFUL
TO PERSISTENT FORMER STUDENTS

How program could have been more helpful.	Persisters				Total	
	Dropouts		Graduates			
	N	%	N	%	N	%
A closer relationship could exist between students and instructors.	1	4.55	2	3.85	3	4.06
A wider range of courses could be offered.	8	36.36	19	36.54	27	36.49
More supervision and guidance in classwork could be offered.	3	13.63	4	7.69	7	9.45
More supervision and guidance while on placement training could be offered.	1	4.55	11	21.15	12	16.21
There could be more helpful guidance in choice and explanation of courses.	5	22.72	10	19.23	15	20.27
There could be more student activities.	2	9.09	1	1.92	3	4.06
Other response.	1	4.55	3	5.77	4	5.40
Response omitted.	1	4.55	2	3.85	3	4.06
Totals	22	100.00	52	100.00	74	100.00

TABLE XVI

HOW PROGRAM COULD HAVE BEEN MORE HELPFUL
TO NON-PERSISTENT FORMER STUDENTS

How program could have been more helpful.	Non-persisters				Total	
	Dropouts		Graduates			
	N	%	N	%	N	%
A closer relationship could exist between students and instructors.	4	12.50	1	3.70	5	8.48
A wider range of courses could be offered.	11	34.38	10	37.04	21	35.59
More supervision and guidance in classwork could be offered.	4	12.50	3	11.11	7	11.86
More supervision and guidance while on placement training could be offered.	2	6.25	7	25.93	9	15.25
There could be more helpful guidance in choice and explanation of courses.	7	21.88	2	7.41	9	15.25
There could be more student activities.	1	3.12	2	7.41	3	5.09
Other response.	3	9.37	1	3.70	4	6.78
Response omitted.	-	-	1	3.70	1	1.70
Totals	32	100.00	27	100.00	59	100.00

The questionnaire completed by former students included two open-end or free response questions. The responses were coded to form nine categories for each question. The first question asked "what the students liked most about the program." Responses of the persisters are summarized in Table XVII and of non-persisters in Table XVIII. Twenty-five persistent former students and twelve non-persistent former students like the practicality of the program. The placement training experience was liked most by nearly 20 per cent of the persistent graduates. Only one persistent dropout and three non-persistent former students indicated that they liked placement training the most.

It is interesting to note that more non-persistent dropouts than non-persistent graduates, 18.75 per cent compared to 14.81 per cent, liked the atmosphere and personal attention of the program. A comparison of data in Tables XVII and XVIII also reveals that the non-persisters, as a group, liked the atmosphere and personal attention of the program more than the persisters did.

Free responses concerning courses included in the program were categorized into two groups, "all courses" and "specific courses." Responses indicating no particular course or courses were coded as "all courses." Examples of such responses would be: "liked all courses" or "course work." If a particular course or set of courses were mentioned, the

TABLE XVII

WHAT PERSISTENT FORMER STUDENTS LIKED MOST ABOUT THE PROGRAM

What was liked most.	Persisters				Total	
	Dropouts		Graduates			
	N	%	N	%	N	%
All courses.	3	13.63	5	9.61	8	10.82
Specific courses.	3	13.63	8	15.39	11	14.86
Placement training.	1	4.55	10	19.23	11	14.86
Instructors.	1	4.55	3	5.77	4	5.41
Practicality of program.	9	40.91	16	30.76	25	33.77
Atmosphere and personal attention of program.	2	9.09	6	11.54	8	10.82
Fellow students.	2	9.09	2	3.85	4	5.41
Other response.	-	-	-	-	-	-
Unrelated response.	1	4.55	-	-	1	1.35
Response omitted.	-	-	2	3.85	2	2.70
Totals	22	100.00	52	100.00	74	100.00

TABLE XVIII

WHAT NON-PERSISTENT FORMER STUDENTS LIKED MOST ABOUT THE PROGRAM

What was liked most.	Non-persisters				Total	
	Dropouts		Graduates			
	N	%	N	%	N	%
All courses.	3	9.38	7	25.93	10	16.95
Specific courses.	7	21.88	5	18.52	12	20.34
Placement training.	2	6.25	1	3.70	3	5.08
Instructors.	4	12.50	2	7.41	6	10.16
Practicality of program.	6	18.75	6	22.22	12	20.34
Atmosphere and personal attention of program.	6	18.75	4	14.81	10	16.95
Fellow students.	-	-	-	-	-	-
Other response.	1	3.12	-	-	1	1.70
Unrelated response.	1	3.12	-	-	1	1.70
Response omitted.	2	6.25	2	7.41	4	6.78
Totals	32	100.00	27	100.00	59	100.00

response was coded as "specific courses"; for example, "plant identification," or "personnel management." As shown in Table XVII, eight persistent respondents indicated they liked "all courses," while eleven indicated "specific courses." Ten non-persisters indicated that they liked "all courses" most, but it seems noteworthy that seven of these non-persisters were graduates and only three were drop-outs. Twenty per cent of the non-persisters, seven dropouts and five graduates, indicated they liked specific courses in the Landscape and Nursery Technician program. One non-persistent dropout stated in the "other" category that the program allowed him "an opportunity to determine goals."

In the second open-end, free response question, the former students were asked what they disliked most about the Landscape and Nursery Technician program. The persistent former students gave widely varying responses to what they disliked. Their responses are grouped in nine categories, with just over 20 per cent of them placed in the "other" category. Dislikes in the "other" category included: "too far from home"; "limited opportunity to see industry"; "too many 8 o'clocks"; "little transferabiltiy of courses"; "limited range of courses"; "no opportunity to waive courses"; "program length -- should be three terms"; "needs more plant diseases, insects, turfgrass, and landscape management"; "lack of specialized courses"; "type of student the program draws"; "poor attitude of students"; "counselor

serving as teacher"; "should start late in October"; "poor arrangement of class schedule"; and "not enough landscape and nursery courses."

Inspection of Table XIX reveals that responses from persistent dropouts were more evenly distributed among the nine categories than were the responses of the persistent graduates. Interestingly, nearly 23 per cent of the dropouts reported no dislikes about the Landscape and Nursery Technician program compared to less than eight per cent of the persistent graduates. Nearly 20 per cent of the persistent graduates indicated dissatisfaction with specific courses while more than 17 per cent revealed a dislike of instructor attitudes. Generally speaking, graduate persisters were more critical of the Landscape and Nursery Technician program than dropout persisters.

Fifteen non-persisters indicated a dislike for specific courses as shown in Table XX. As with the persisters, the non-persisters gave a wide variety of answers to the question concerning their dislikes of the program. Eleven responses were classified as "other" responses: "not enough landscape architecture courses"; "need more field trips"; "courses spread out over campus, too much"; "lack of business law courses"; "not enough depth"; "discipline"; "certain courses, attitude of instructors, and placement training"; and "need more theory courses in management." Two respondents indicated "other students." Seven of the

TABLE XIX

WHAT PERSISTENT FORMER STUDENTS DISLIKED MOST ABOUT THE PROGRAM

What was disliked most.	Persisters				Total	
	Dropouts		Graduates			
	N	%	N	%	N	%
Specific courses.	3	13.64	10	19.23	13	17.57
Required courses.	3	13.64	3	5.77	6	8.11
Instructor attitudes.	2	9.09	9	17.31	11	14.86
Lack of motivational factors.	1	4.55	4	7.69	5	6.75
Did not feel part of university.	2	9.09	2	3.85	4	5.41
Placement training.	-	-	1	1.92	1	1.35
Other response.	2	9.09	14	26.92	16	21.16
No dissatisfaction with program.	5	22.72	4	7.69	9	12.16
Unrelated response.	1	4.55	-	-	1	1.35
Response omitted.	3	13.63	5	9.62	8	10.82
Totals	22	100.00	52	100.00	74	100.00

TABLE XX

WHAT NON-PERSISTENT FORMER STUDENTS DISLIKED MOST ABOUT THE PROGRAM

What was disliked most.	Non-persisters				Total	
	Dropouts		Graduates			
	N	%	N	%	N	%
Specific courses.	9	28.13	6	22.22	15	25.43
Required courses.	2	6.25	3	11.11	5	8.48
Instructor attitudes.	1	3.12	3	11.11	4	6.78
Lack of motivational factors.	6	18.75	1	3.70	7	11.86
Did not feel part of university.	1	3.12	-	-	1	1.70
Placement training.	-	-	2	7.41	2	3.39
Other response.	4	12.50	7	25.93	11	18.64
No dissatisfaction with program.	4	12.50	3	11.11	7	11.86
Unrelated response.	-	-	-	-	-	-
Response omitted.	5	15.63	2	7.41	7	11.86
Totals	32	100.00	27	100.00	59	100.00

non-persisters expressed no dissatisfaction with the program. Table XIX brings out that nine of the persisters also expressed no dissatisfaction with the Landscape and Nursery Technician program.

Job And Educational Histories Of Former Students

Employed former students were asked to indicate their salaries within ranges of two thousand dollars. Table XXI reveals the salary ranges of the respondents. This table does not include data from students in school, in military service, or those unemployed. Since salaries were given in ranges, only approximate salary means can be determined for each category of former students. The persistent graduates have the highest mean salary; next in order are the persistent dropouts, the non-persistent dropouts, and the non-persistent graduates.

An attempt was made to determine the satisfaction of former students with their present jobs. As shown in Table XXII, 87.50 per cent of the former students indicated they were "satisfied" or "very satisfied" with their jobs. Over 90 per cent of the persisters rated their satisfaction as "satisfied" or "very satisfied". Eight non-persistent former students as compared to two persistent former students rated their satisfaction as "dissatisfied" or "very dissatisfied". It should be noted that the non-persistent dropouts tend to be more dissatisfied with their present jobs than do the non-persistent graduates since six

TABLE XXI

PRESENT SALARIES OF EMPLOYED FORMER STUDENTS

Salary Ranges	Persisters				Non-persisters				Total	
	Dropouts		Graduates		Dropouts		Graduates			
	N	%	N	%	N	%	N	%	N	%
Less than $3,500	-	-	-	-	-	-	-	-	-	-
$3,500 - $5,499	-	-	1	2.86	3	13.04	2	10.53	6	6.82
$5,500 - $7,499	2	18.18	5	14.29	8	34.78	10	52.63	25	28.41
$7,500 - $9,499	4	36.36	9	25.71	8	34.78	4	21.06	25	28.41
$9,500 - $11,499	3	27.27	12	34.29	4	17.39	1	5.26	20	22.73
$11,500 - $13,499	1	9.09	2	5.71	-	-	-	-	3	3.41
$13,500 - $15,499	1	9.09	-	-	-	-	1	5.26	2	2.27
$15,500 and over	-	-	3	8.57	-	-	-	-	3	3.41
Response omitted	-	-	3	8.57	-	-	1	5.26	4	4.54
Totals	11	100.00	35	100.00	23	100.00	19	100.00	88	100.00
Mean Salaries	$9,500		$9,700		$7,600		$7,400		$8,600	

TABLE XXII

SATISFACTION OF EMPLOYED FORMER STUDENTS
WITH PRESENT JOB

Degree of Satisfaction	Persisters				Non-persisters				Total	
	Dropouts		Graduates		Dropouts		Graduates			
	N	%	N	%	N	%	N	%	N	%
Very Satisfied	6	54.55	15	42.86	6	26.09	4	21.05	31	35.23
Satisfied	4	36.36	18	51.42	11	47.83	13	68.42	46	52.27
Dissatisfied	1	9.09	1	2.86	5	21.74	2	10.53	9	10.22
Very Dissatisfied	-	-	-	-	1	4.34	-	-	1	1.14
Response omitted	-	-	1	2.86	-	-	-	-	1	1.14
Totals	11	100.00	35	100.00	23	100.00	19	100.00	88	100.00

of the eight previously mentioned non-persisters are dropouts. As in the compilation of salary information, only the data provided by the eighty-eight former students who are employed are included in this analysis.

To determine job stability, the former students were asked to list all the jobs they have held since leaving high school in which they worked more than twenty hours per week and for two months or longer. The mean number of jobs listed in Table XXIII varies only slightly across all categories of former students, with a low mean of 1.62 jobs for persistent dropouts to a high mean of 2.12 jobs for non-persistent dropouts. It should be noted that the former students who supplied data about their employment could have worked for several years or for only a short period since graduation from high school. No attempt was made to determine when they graduated from high school or when they were first employed. Jobs held while in military service or while in college were not considered in this analysis.

In Chapter I it was hypothesized as follows:

> Job satisfaction, salary, and job stability are each directly related to persistence in the technical training program and occupational persistence.

To test this hypothesis the alternate or null form was stated and tested by analysis of variance.

In the null form this hypothesis specifies that there are no significant differences in job satisfaction, salary, and job stability among persistent dropouts,

TABLE XXIII

NUMBER OF JOBS HELD BY FORMER STUDENTS

Number of Jobs	Persisters				Non-persisters				Total	
	Dropouts		Graduates		Dropouts		Graduates			
	N	%	N	%	N	%	N	%	N	%
0	6	27.27	1	1.92	2	6.25	1	3.70	10	7.52
1	4	18.18	17	32.69	7	21.88	11	40.74	39	29.32
2	6	27.27	16	30.77	11	34.37	8	29.63	41	30.83
3	2	9.09	15	28.85	9	28.12	2	7.41	28	21.05
4	3	13.64	2	3.85	3	9.38	4	14.82	12	9.02
Response Omitted	1	4.55	1	1.92	-	-	1	3.70	3	2.26
Totals	22	100.00	52	100.00	32	100.00	27	100.00	133	100.00
Mean Number of Jobs	1.62		2.00		2.12		1.88		1.95	

persistent graduates, non-persistent dropouts, and non-persistent graduates. Eleven former students in the persistent dropout category provided useable responses. To facilitate analysis, each of the remaining three categories of former students was reduced to eleven by placing the identification numbers of former students in a box and randomly drawing out eleven numbers.

As shown in Table XXIV, a multivariate F, was considered significant at the .09 level (P = .0906) between persisters and non-persisters. No significant differences in job satisfaction, salary,or job stability were found between graduates and dropouts, nor were there any interactions.

TABLE XXIV

SUMMARY OF TEST FOR SIGNIFICANCE IN JOB SATISFACTION, SALARY, AND JOB STABILITY AMONG PERSISTENT DROPOUTS, PERSISTENT GRADUATES, NON-PERSISTENT DROPOUTS, AND NON-PERSISTENT GRADUATES

Sources	d.f.	Multivariate F	P
Persisters and Non-persisters	1	2.3216	.0906 (S)
Graduates and Dropouts	1	.0529	.9838 (NS)
Interactions	1	.4505	.7185 (NS)

Inspection of Table XXV reveals in the analysis of persisters and non-persisters that a "step down F" value of

TABLE XXV

SUMMARY OF STEP-DOWN F TEST FOR JOB SATISFACTION, SALARY, AND JOB STABILITY AMONG PERSISTENT DROPOUTS, PERSISTENT GRADUATES, NON-PERSISTENT DROPOUTS, AND NON-PERSISTENT GRADUATES.

Variables	Sources					
	Persisters and Non-persisters		Graduates and Dropouts		Interactions	
	Step-down F	P	Step-down F	P	Step-down F	P
Salary	5.8987	0.0198 (S)	0.1471	0.7034 (NS)	0.1471	0.7034 (NS)
Satisfaction	1.1093	0.2988 (NS)	0.0115	0.9151 (NS)	1.0207	0.3186 (NS)
Stability	0.1024	0.7508 (NS)	0.0077	0.9306 (NS)	0.2073	0.6515 (NS)

5.8987 and a P value of .0198 indicates a significant difference exists between the mean salary of persisters and non-persisters at the .02 level of significance.

Based upon the statistical analysis, the null hypothesis of no difference cannot be rejected for the factors of job stability and job satisfaction. The null hypothesis cannot be accepted as true for the factor of salary.

Former students now in military service and those who are veterans were asked to indicate their employment or educational statuses before entering the military service. These data provided sources of information to identify those now in military service who are persisters as defined in Chapter I.

Inspection of the data in Tables XXVI and XXVII reveals differences in responses between former students now in the military service and those who are veterans as to their statuses before and their planned or actual statuses after military service. Sixteen or 88.88 per cent of the former students, now in the military service, were classified as persisters. By way of comparison, 60 per cent of the veterans were classified as persisters before they entered the service. Eleven or 61 per cent of the former students now in the military service plan to be employed in or to resume their education to become employed in the landscape and nursery industry. After discharge

TABLE XXVI

STATUS BEFORE ENTERING MILITARY SERVICE OF THOSE FORMER STUDENTS NOW IN MILITARY SERVICE AND OF THOSE WHO ARE VETERANS

Status	Now in Military Service		Veterans	
	N	%	N	%
A student studying for a position in the landscape and nursery industry.	5*	27.77	5*	16.67
A student studying for a position not related to the landscape and nursery industry.	1	5.56	1	3.33
Employed in a position related to the landscape and nursery industry.	10*	55.55	13*	43.33
Employed in a job not related to the landscape and nursery industry.	1	5.56	9	30.00
Self-employed in the landscape and nursery industry.	1*	5.56	-	-
Self-employed in an occupation not related to the landscape and nursery industry.	-	-	-	-
Unemployed	-	-	2	6.67
Totals	18	100.00	30	100.00

*Classified as Persisters

TABLE XXVII

EMPLOYMENT OR EDUCATIONAL PLANS OF FORMER STUDENTS NOW IN MILITARY SERVICE AND ACTUAL STATUS AFTER DISCHARGE OF FORMER STUDENTS WHO ARE VETERANS

Status	Now in Military Service		Veterans	
	N	%	N	%
Enroll in an educational institution for study related to the landscape and nursery industry.	2*	11.11	4*	13.33
Take a job in the landscape and nursery industry.	8*	44.44	10*	33.34
Become self-employed in the landscape and nursery industry.	1*	5.56	-	-
Enroll in an educational institution for study not related to the landscape and nursery industry.	3	16.66	6	20.00
Take a job which is not related to the landscape and nursery industry.	1	5.56	9	30.00
Become self-employed in an occupation not related to the landscape and nursery industry.	2	11.11	1	3.33
Not look for work.	-	-	-	-
Response omitted.	1	5.56	-	-
Totals	18	100.00	30	100.00

*Classified as Persisters

approximately 47 per cent of the veterans entered the landscape and nursery industry either as students or as employees.

Fourteen veterans entered the landscape and nursery industry after discharge as indicated in Table XXVII. Table XXVI lists eighteen veterans as being in the landscape and nursery industry before entering the service; thus four veterans dropped out of the landscape and nursery work after discharge from the military service.

Thirty graduates and twenty-eight dropouts continued their education after leaving the Landscape and Nursery Technician program. Tables XXVIII and XXIX reveal why these students continued their education. Of the thirty graduates indicated in Table XXVIII, all of whom continued their education, fifteen were persisters and fifteen were non-persisters. Eight of these persisters indicated that they continued their education to obtain a position in the landscape and nursery industry which required a higher level of education. Two persisters responded in the "other" category. One stated that he wanted to "expand (his) knowledge in other fields -- art, math." The second wrote that he wanted a refresher course. One-third of the non-persisters continued their education in order to enter a field of work other than the landscape

TABLE XXVIII

REASONS FOR FORMER STUDENTS CONTINUING EDUCATION
AFTER GRADUATING FROM THE PROGRAM

Reasons for Continuing Education	Persisters		Non-persisters		Total	
	N	%	N	%	N	%
You desired a position in the landscape and nursery industry which required a higher level of education.	8	53.34	1	6.67	9	30.00
You wished to learn a different skill or trade.	3	20.00	3	20.00	6	20.00
You were strongly encouraged by parents and/or friends to continue.	2	13.33	3	20.00	5	16.67
You desired to enter a field of work other than the landscape and nursery industry requiring a higher level of education.	-	-	5	33.33	5	16.67
You were not sure what you wanted to do.	-	-	3	20.00	3	10.00
Other	2	13.33	-	-	2	6.66
Totals	15	100.00	15	100.00	30	100.00

and nursery industry requiring a higher level of education. Nine of the remaining responses were divided evenly among three reasons: the former student wished to learn a different skill or trade; he was strongly encouraged by parents and/or friends to continue; and he was not sure what he wanted to do. One non-persister indicated that he desired a position in the landscape and nursery industry which required a higher level of education.

An examination of Table XXIX reveals that ten or 83.33 per cent of the persistent dropouts reported that they continued their education because they desired a position in the landscape and nursery industry which required a higher level of education. The remaining two persisters indicated they desired to enter another field of work as the reason for withdrawing, yet they were classified as persisters at the time of this study.

The non-persisters were more evenly divided in the reasons which they gave for continuing their education. Four or 25 per cent indicated that they wished to learn a different skill or trade, while four or 25 per cent desired to enter a field of work other than the landscape and nursery industry requiring a higher level of education. Three of the non-persisters continued their education after withdrawal from the program because of strong encouragement from parents and/or friends. Two indicated they continued for they were not sure what they wanted to do.

TABLE XXIX

REASONS FOR FORMER STUDENTS CONTINUING EDUCATION
AFTER WITHDRAWAL FROM THE PROGRAM

Reasons for Continuing Education	Persisters		Non-persisters		Total	
	N	%	N	%	N	%
You desired a position in the landscape and nursery industry which required a higher level of education.	10	83.33	2	12.50	12	42.87
You wished to learn a different skill or trade.	-	-	4	25.00	4	14.29
You were strongly encouraged by parents and/or friends to continue.	-	-	3	18.75	3	10.71
You desired to enter a field of work other than the landscape and nursery industry requiring a higher level of education.	2	16.67	4	25.00	6	21.42
You were not sure what you wanted to do.	-	-	2	12.50	2	7.14
Other	-	-	-	-	-	-
Response omitted.	-	-	1	6.25	1	3.57
Totals	12	100.00	16	100.00	28	100.00

The two remaining non-persisters desired a position in the landscape and nursery industry which required a higher level of education. As with the one non-persistent graduate listed in Table XXVII, a question is raised as to why they became non-persisters. A definite answer is beyond the scope of this study.

A study of Table XXX brings out that thirteen or 35.14 per cent of the persistent graduates did not continue their education because their present education was adequate for the work they are doing. Twelve persistent graduates indicated that they did not continue their education because they secured a full-time position which they preferred to continued education. Of the forty-nine graduates not continuing their education, twelve were non-persisters. Six of these non-persisters secured a full-time position which they preferred to continued education.

The reasons why twenty-six dropouts did not continue their education after withdrawing from the Landscape and Nursery Technician program are listed in Table XXXI. Eleven or 42.34 per cent of the dropouts entered the military. Six or 23.06 per cent of the former students withdrew because they secured full-time positions which were preferred to continued education.

To determine the amount of their education since high school, former students were asked to list the beginning

TABLE XXX

REASONS FOR FORMER STUDENTS NOT CONTINUING EDUCATION
AFTER GRADUATING FROM THE PROGRAM

Reasons for not Continuing Education	Persisters		Non-persisters		Total	
	N	%	N	%	N	%
You felt you had an adequate education for work in a particular area.	13	35.14	2	16.67	15	30.61
You were unable to transfer to another college because your grade point average was not high enough.	1	2.70	-	-	1	2.04
You could not afford to continue.	3	8.11	1	8.33	4	8.16
You felt that additional higher education had little to offer.	1	2.70	1	8.33	2	4.08
You secured a full-time position which you preferred to continued education.	12	32.43	6	50.00	18	36.73
You married.	2	5.41	1	8.33	3	6.12
You entered the military.	5	13.51	1	8.34	6	12.25
Other	-	-	-	-	-	-
Totals	37	100.00	12	100.00	49	100.00

TABLE XXXI

REASONS FOR FORMER STUDENTS NOT CONTINUING EDUCATION
AFTER WITHDRAWING FROM THE PROGRAM

Reasons for not Continuing Education	Persisters		Non-persisters		Total	
	N	%	N	%	N	%
You felt you had an adequate education for work in a particular area.	2	20.00	1	6.25	3	11.53
You were unable to transfer to another college because your grade point average was not high enough.	1	10.00	1	6.25	2	7.69
You could not afford to continue.	-	-	1	6.25	1	3.85
You felt that additional higher education had little to offer.	-	-	-	-	-	-
You secured a full-time position which you preferred to continued education.	2	20.00	4	25.00	6	23.06
You married.	-	-	3	18.75	3	11.53
You entered the military.	5	50.00	6	37.50	11	42.34
Other	-	-	-	-	-	-
Totals	10	100.00	16	100.00	26	100.00

and ending dates of enrollment in formal educational programs after high school. Table XXXII reveals that thirty-six or 27.07 per cent of the former students received formal education ranging from nineteen to twenty-four months since high school. During the period of time in this study, 1964 to 1970, the Landscape and Nursery Technician program required twenty-four months to complete. Twenty-three or 17.29 per cent of the former students completed from 25 to 30 months of education. The same number of former students completed 48 or more months of education. The non-persistent dropouts tended to complete fewer months of formal education after leaving high school.

The three major areas of study of former students are summarized in Table XXXIII. Seventy-two or 54.14 per cent of the former students have studied only landscape and nursery related areas. Fifty-five or 41.35 per cent of the former students have studied landscape and nursery and non-related areas. It is interesting to note that nearly 14 per cent of the persistent dropouts and 42 per cent of the persistent graduates have studied areas not related to the landscape and nursery industry or to other agriculture. As might be expected a larger per cent of the non-persisters, approximately 50 per cent of both dropouts and graduates, have studied areas not related to the landscape and nursery industry or other agriculture.

TABLE XXXII

MONTHS OF FORMAL EDUCATION RECEIVED BY FORMER STUDENTS SINCE LEAVING HIGH SCHOOL

Months of Formal Education Received	Persisters				Non-persisters				Total	
	Dropouts		Graduates		Dropouts		Graduates			
	N	%	N	%	N	%	N	%	N	%
Less than 6 months	3	13.64	-	-	10	31.25	-	-	13	9.77
6 to 12 months	7	31.82	-	-	4	12.50	-	-	11	8.27
13 to 18 months	-	-	-	-	-	-	-	-	-	-
19 to 24 months	1	4.54	21	40.39	7	21.89	7	25.93	36	27.07
25 to 30 months	1	4.54	12	23.08	4	12.50	6	22.22	23	17.29
31 to 36 months	-	-	2	3.85	4	12.50	2	7.41	8	6.02
37 to 42 months	2	9.09	5	9.61	1	3.12	4	14.81	12	9.02
43 to 48 months	3	13.64	1	1.92	1	3.12	2	7.41	7	5.27
More than 48 months	5	22.73	11	21.15	1	3.12	6	22.22	23	17.29
Totals	22	100.00	52	100.00	32	100.00	27	100.00	133	100.00
Approximate Mean Number of Months	26		31		19		37		28	

TABLE XXXIII

MAJOR AREAS OF STUDY OF FORMER STUDENTS

Major Areas of Study	Persisters				Non-persisters				Total	
	Dropouts		Graduates		Dropouts		Graduates			
	N	%	N	%	N	%	N	%	N	%
All Landscape and Nursery related.	17	77.27	30	57.69	15	46.88	10	37.04	72	54.14
Landscape and Nursery related and other agriculture.	1	4.55	-	-	1	3.12	3	11.11	5	3.76
Landscape and Nursery related and non-related study.	3	13.64	22	42.31	16	50.00	14	51.85	55	41.35
Response omitted.	1	4.55	-	-	-	-	-	-	1	.75
Totals	22	100.00	52	100.00	32	100.00	27	100.00	133	100.00

Six possible programs of formal education which may have been available to former students in addition to the Landscape and Nursery Technician program were listed in the questionnaire used in this study. Former students were asked to indicate all educational programs in which they had participated. As presented in Table XXXIV, community colleges have been attended by thirty-two of the former students. Forty-eight of the former students have attended a four-year college. Eleven former students attended technical schools other than the Institute of Agricultural Technology. An educational program to up-date occupational skills might be the workshop or short course. Such educational programs were attended by five persisters and four non-persisters.

The highest certificate or degree earned by former students is indicated in Table XXXV. As used in this study, "certificate" refers to a document issued by an educational institution to persons completing the requirements of a technical education program of varying lengths. The "associate degree" refers to the degree offered by community colleges to persons completing a program, usually academic in nature and two years in length. A certificate was earned by seventy-two or 54.13 per cent of the former students. The category "certificate" included certificates earned in other educational programs as well as the Landscape and Nursery Technician program. Three former students,

TABLE XXXIV

FORMAL EDUCATIONAL PROGRAMS ATTENDED
BY FORMER STUDENTS

Educational Programs	Persisters		Non-persisters		Total
	Dropouts	Graduates	Dropouts	Graduates	
	N	N	N	N	N
Landscape & Nursery program and:					
Other Ag. Tech. programs.	-	1	-	2	3
Community colleges	2	14	7	9	32
Technical schools	-	3	6	2	11
Four-year institutions	12	17	7	12	48
Workshops, short courses, etc.	1	4	2	2	9

TABLE XXXV

HIGHEST CERTIFICATE OR DEGREE EARNED
BY FORMER STUDENTS

Certificate or Degree	Persisters				Non-persisters				Total	
	Dropouts		Graduates		Dropouts		Graduates			
	N	%	N	%	N	%	N	%	N	%
No certificate or degree.	16	72.73	-	-	25	78.13	-	-	41	30.83
Certificate	2	9.09	43	22.69	4	12.50	23	85.19	72	54.13
Associate degree	-	-	2	3.85	1	3.12	-	-	3	2.26
B.S. degree	3	13.64	7	13.46	2	6.25	4	14.81	16	12.03
M.S. degree	1	4.54	-	-	-	-	-	-	1	.75
Ph.D. degree	-	-	-	-	-	-	-	-	-	-
Totals	22	100.00	52	100.00	32	100.00	27	100.00	133	100.00

two graduate persisters and one non-persistent dropout, earned associate degrees. Sixteen former students earned the baccalaureate degree. Seven of these were persistent graduates, four were non-persistent graduates, three were persistent dropouts, and two were non-persistent dropouts. One persistent dropout has earned the masters degree.

The term dropout, when applied to an individual or group of individuals,sometimes implies the lack of success in education. While this may be true with some of the former students included in this study, in general, the term dropout refers only to withdrawal from the Landscape and Nursery Technician program. Referring again to Tables XXXII and XXXV, the reader's attention is called to the fact that twelve or 55 per cent of the persistent dropouts and eighteen or 56 per cent of the non-persistent dropouts completed more than eighteen months of formal education beyond high school. Two of the persistent dropouts have earned technical certificates, three have earned baccalaureate degrees, and one has earned a masters degree. The non-persistent dropouts include four with technical certificates, one with an associate degree, and two with baccalaureate degrees.

As mentioned previously, the Landscape and Nursery Technician program required twenty-four months to complete. Table XXXII reveals that thirty-one or 60 per cent of the

persistent graduates completed education in addition to the Landscape and Nursery Technician program. Eleven or 21.15 per cent of them were enrolled in more than forty-eight months of formal education beyond high school. Table XXXV indicates that two of the persistent graduates earned an associate degree and seven earned baccalaureate degrees. According to data in Table XXXII, nearly three-fourths of the non-persistent graduates completed education in addition to the Landscape and Nursery Technician program, yet only four of these have earned degrees at the time of this study.

Ability To Function Effectively

Each employer was asked to rate the former student in his employ on twelve personality traits. The traits were presented as a set of positive statements descriptive of each trait. The rating scale values ranged from "strongly agree" with a numerical value of 7, to "strongly disagree" with a numerical value of 1, although these scale values were assigned after the employers returned the questionnaires on which they rated former students in their employ.

Table XXXVI lists the twelve traits and the positive statements in rank order based on the combined ratings of all persistent former students. Employers rated persistent graduates higher than persistent dropouts on all traits. "Integrity" received the highest mean rating and "leadership" received the lowest mean rating by employers of both

TABLE XXXVI

EMPLOYER RATINGS OF PERSONALITY TRAITS
OF PERSISTENT FORMER STUDENTS*

Personality Traits and Positive Statements	Mean and Rank of Traits					
	Dropouts (N=5)		Graduates (N=25)		All Persisters (N=30)	
	Mean	Rank	Mean	Rank	Mean	Rank
Integrity: He is trustworthy, honest, and loyal.	6.00	1.0	6.68	1.0	6.56	1.0
Responsibility: He is willing to accept and perform work.	5.40	4.0	6.52	3.0	6.33	2.0
Attitude Toward Work: He is enthusiastic in the performance of his work.	5.60	2.5	6.44	5.0	6.30	3.5
Personal Appearance: He is neat, clean, and dresses appropriately.	4.60	6.5	6.64	2.0	6.30	3.5
Dependability: He is prompt and reliable.	5.60	2.5	6.32	6.0	6.20	5.0

*Based on a seven point scale: 7 = Strongly agree; 1 = Strongly disagree

TABLE XXXVI (continued)

Personality Traits and Positive Statements	Mean and Rank of Traits					
	Dropouts (N=5)		Graduates (N=25)		All Persisters (N=30)	
	Mean	Rank	Mean	Rank	Mean	Rank
Cooperation: He has the ability to work with others in harmony.	4.80	5.0	6.48	4.0	6.00	6.5
Emotional Stability: He has poise and self-control.	4.60	6.5	6.28	7.5	6.00	6.5
Courtesy and Friendliness: He is considerate of and kind to others.	4.40	9.0	6.28	7.5	5.96	8.0
Potentialities: He meets and applies himself to new situations.	4.40	9.0	5.88	10.5	5.63	10.0
Judgment: He has the ability to make sound decisions.	4.40	9.0	5.88	10.5	5.63	10.0
Initiative: He has the ability to plan and direct his own work.	4.20	11.5	5.92	9.0	5.63	10.0
Leadership: He understands people and can direct the work of others.	4.20	11.5	5.76	12.0	5.50	12.0

dropouts and graduates. The greatest differences in rankings between dropouts and graduates on the twelve traits were: "personal appearance" with a rank of 6.5 for dropouts and 2.0 for graduates; and "dependability" with 2.5 for dropouts and 6.0 for graduates.

Participation In Activities And Organizations

An attempt was made to measure the extent of participation by former students in activities and organizations which affect the communities where they live and the landscape and nursery industry. Persistent former students were asked to check all activities or organizations in which they participated and to indicate those in which they were officers. Membership and officer data for the persisters are shown in Table XXXVII. Five dropouts and ten graduates did not participate in any activity or organization. The seventeen persistent dropouts participated in thirty-two activities, an average of approximately two per individual. The forty-two persistent graduates participated in eighty-seven activities for an average of just over two per individual. Only thirty-three persisters indicated participation in local landscape and nursery organizations. No persistent dropouts were officers. Ten persistent graduates were officers.

Participation by non-persisters in activities and organizations is shown in Table XXXVII. Thirteen dropouts

TABLE XXXVII

PARTICIPATION IN ACTIVITIES AND ORGANIZATIONS
BY PERSISTENT FORMER STUDENTS

Activities and Organizations	Persisters*				Total	
	Dropouts N=22		Graduates N=52			
	Member Only	Member and Officer	Member Only	Member and Officer	Member Only	Member and Officer
Civic clubs	2	-	4	1	6	1
Fraternal organizations	3	-	3	2	6	2
Political party organizations	1	-	5	-	6	-
Local landscape and nursery organizations	7	-	26	-	33	1
State landscape and nursery organizations	3	-	18	1	21	1
National landscape and nursery organizations	4	-	6	1	10	1
Other industry organizations	1	-	2	-	3	-
Labor unions	1	-	3	-	4	-
Agricultural organizations	-	-	1	2	1	2
Schools: parent organ.	-	-	-	1	-	1
Schools: Bd. of Education	-	-	1	-	1	-
Social clubs	1	-	6	-	7	-
Civic committees	1	-	3	-	4	-
Veteran organizations	1	-	-	-	1	-
Garden clubs	1	-	5	-	6	-
Other	6	-	4	1	10	1

*Number not participating in any activity or organization: Dropouts = 5; and Graduates = 10.

TABLE XXXVIII

PARTICIPATION IN ACTIVITIES AND ORGANIZATIONS
BY NON-PERSISTENT FORMER STUDENTS

Activities and Organizations	Non-persisters*				Total	
	Dropouts N=32		Graduates N=27			
	Member Only	Member and Officer	Member Only	Member and Officer	Member Only	Member and Officer
Civic clubs	1	-	4	-	5	-
Fraternal organizations	2	-	2	-	4	-
Political party organization	-	1	2	-	2	1
Local landscape and nursery organizations	-	-	1	-	1	-
State landscape and nursery organizations	-	-	-	-	-	-
National landscape and nursery organizations	-	-	-	-	-	-
Other industry organizations	5	-	4	-	9	-
Labor unions	5	1	7	-	12	1
Agricultural organizations	2	-	3	-	5	-
Schools: parent organ.	1	-	1	-	2	-
Schools: Bd. of Education	-	-	1	1	1	1
Social clubs	1	-	4	-	5	-
Civic committees	-	-	-	-	-	-
Veteran organizations	3	-	2	-	5	-
Garden clubs	-	-	3	-	3	-
Other	1	-	3	-	4	-

*Number not participating in any activity or organization: Dropouts = 13; and Graduates = 5.

and five graduates did not participate in any activities or organizations. The nineteen non-persistent dropouts who participated, averaged just over one activity each. The twenty-seven non-persistent graduates participated in thirty-seven activities and organizations. Three organizations have non-persisters as officers. Twelve non-persisters were members of labor unions compared to four persisters. None of the non-persisters indicated participation in civic committees, while four persisters participated.

The remainder of this chapter is focused on four considerations related to fifty-five selected landscape and nursery job competencies:

1. importance of each competency;
2. when or where the persistent former students learned most about each competency;
3. competencies needed by supervisory or technician level personnel, but not provided to former students while they were enrolled in the technician program;
4. ability of the former students to perform each competency.

Importance Of Fifty-five Selected Competencies

To determine the importance of the fifty-five selected competencies, persistent former students and their employers were asked to rate the competencies. The rating items and their assigned numerical values were as follows: not required = 0; slight importance = 1; considerable importance = 2; and critical importance = 3.

The ratings made by the forty-six employed persisters concerning the importance of the fifty-five selected competencies are summarized in Table XXXIX. A summary of corresponding ratings provided by the thirty employers is presented in Table XL.

According to Table XXXIX, at least one of the former students rated each of the fifty-five competencies critically important. Competency 2, identification of diseases, insects, and other pests, was the only competency rated required and important to some degree by all former students.

An examination of Table XL reveals that one or more of the employers rated all competencies critically important except 18, propagation of landscape plants, and 23, performing field experiments to develop methods of using agricultural chemicals. Number 49, maintenance of effective working relationships with fellow workers is a competency judged to be of considerable importance or of critical importance by twenty-nine of the employers. At least one of the employers rated all other competencies except number 49, as not required or slightly important.

An examination of Table XXXIX reveals that the former students often varied considerably in their ratings of the importance of some of the competencies. Approximately thirty per cent or more of the former students rated each of the following competencies critically important, yet

TABLE XXXIX

IMPORTANCE OF FIFTY-FIVE SELECTED COMPETENCIES AS RATED BY FORTY-SIX PERSISTENT FORMER STUDENTS

Selected Competencies	Response Omitted	Ratings of Importance								Mean Importance
		Not Required		Slightly Important		Considerable Importance		Critical Importance		
	N	N	%*	N	%*	N	%*	N	%*	
1. Identification and cultural requirements of landscape plants.	-	1	2.17	4	8.70	21	45.65	20	43.48	2.30
2. Identification of diseases, insects, and other pests.	-	-	-	18	39.13	18	39.13	10	21.74	1.83
3. Identification of nutrient deficiencies in landscape plants.	4	2	4.76	14	33.33	19	45.24	7	16.67	1.74
4. Planning disease and insect control programs.	-	10	21.74	11	23.91	18	39.13	7	15.22	1.48
5. Planning programs for supplying nutrient needs for landscape plants.	-	9	19.57	12	26.09	18	39.13	7	15.22	1.50
6. Advising customers on desirable varieties of landscape plants and their costs.	-	7	15.22	3	6.52	11	23.91	25	54.35	2.17
7. Selling horticultural plants and supplies.	1	15	33.33	3	6.67	9	20.00	18	40.00	1.67
8. Growing and care of sod in the sod producing nursery.	2	33	75.00	7	15.91	2	4.55	2	4.55	0.39
9. Establishing, caring for, and restoring lawns.	1	12	26.67	6	13.33	17	37.78	10	22.22	1.56
10. Pruning landscape plants.	-	2	4.35	6	13.04	21	45.65	17	36.96	2.15
11. Planting and removal of landscape plantings.	1	8	17.78	6	13.33	15	33.33	16	35.56	1.87
12. Performing tree surgery.	1	27	60.00	9	20.00	7	15.56	2	4.44	0.64
13. Identifying weeds affecting landscape plantings.	-	9	19.57	12	26.09	18	39.13	7	15.22	1.50
14. Planning programs for weed control - chem. & cultural.	-	10	21.74	11	23.91	17	36.96	8	17.39	1.50
15. Maintaining, adjusting, repairing, and caring for mechanical equipment.	2	6	13.64	11	25.00	16	36.36	11	25.00	1.73

*Percentage based on usable response

TABLE XXXIX (continued)

Selected Competencies	Response Omitted	Ratings of Importance: Not Required		Slightly Important		Considerable Importance		Critical Importance		Mean Importance
	N	N	%*	N	%*	N	%*	N	%*	
16. Balling and burlapping trees and shrubs.	-	1	2.17	4	8.70	21	45.65	20	43.48	2.30
17. Shipping and storing landscape plants.	-	18	39.13	8	17.39	9	19.57	11	23.91	1.28
18. Propagation of landscape plants.	5	30	73.17	4	9.76	5	12.20	2	4.88	0.49
19. Identification and cultural requirements of bedding plants, bulbs, and herbaceous perennials.	1	17	37.78	13	28.89	10	22.22	5	11.11	1.07
20. Identifying agricultural chemicals - their function, use, and toxic effects for landscape plants.	-	12	26.09	6	13.04	17	36.96	11	23.91	1.59
21. Determining proper rates, mixing, applying, and safe handling of chemicals.	-	9	19.57	4	8.70	19	41.30	14	30.44	1.83
22. Planning a purchasing program for securing agricultural chemicals.	1	27	60.00	6	13.33	8	17.79	4	8.89	0.76
23. Performing field experiments to develop methods of using agricultural chemicals.	1	33	73.33	4	8.89	5	11.11	3	6.67	0.51
24. Adjusting and maintaining application equipment.	1	19	42.22	10	22.22	10	22.22	6	13.33	1.07
25. Operating power driven application equipment.	1	19	42.22	8	17.78	11	24.44	7	15.56	1.13
26. Operating hand operated application equipment.	1	13	28.89	15	33.33	9	20.00	8	17.78	1.27
27. Understanding environmental and human hazards associated with agricultural chemicals.	1	5	11.11	10	22.22	14	31.11	16	35.56	1.91
28. Explaining the origin, development, structure, and texture of soils.	1	18	40.00	13	28.89	10	22.22	4	8.89	1.00
29. Explaining soil acidity.	1	11	24.44	17	37.78	15	33.33	2	4.45	1.18

*Percentage based on usable responses.

TABLE XXXIX (continued)

Selected Competencies	Response Omitted	Ratings of Importance: Not Required		Slightly Important		Considerable Importance		Critical Importance		Mean Importance
	N	N	%*	N	%*	N	%*	N	%*	
30. Explaining the function of soil nutrients.	2	11	25.00	13	29.55	17	38.64	3	6.82	1.27
31. Taking & testing soil samples and interpreting soil tests.	1	31	68.89	5	11.11	8	17.78	1	2.22	0.53
32. Making fertilizer recommendations on basis of soil tests.	1	23	51.11	13	28.89	6	13.33	3	6.67	0.76
33. Planning proper use and application of organic and mineral fertilizers.	2	13	29.55	8	18.18	18	40.91	5	11.36	1.33
34. Planning and determining cost of soil fertility build-up program.	2	30	68.18	9	20.45	3	6.82	2	4.55	0.48
35. Planning & determining cost of maintaining a balanced soil fertility program.	2	26	59.09	8	18.18	6	13.64	4	9.09	0.73
36. Planning a program of soil erosion control.	2	24	54.44	8	18.18	7	15.91	5	11.36	0.84
37. Determining need for and planning drainage systems.	2	15	34.09	7	15.91	13	29.55	9	20.45	1.36
38. Determining need for and planning irrigation systems.	3	21	48.84	7	16.28	7	16.28	8	18.61	1.05
39. Understanding the use of financial records in the business.	3	13	30.23	5	11.63	10	23.26	15	34.88	1.63
40. Understanding the proper use of inventory and rotation records.	3	16	37.21	6	13.95	9	20.93	12	27.91	1.40
41. Understanding the regulations pertaining to hired labor.	2	6	13.64	4	9.09	13	29.55	21	47.73	2.11
42. Understanding the regulations pertaining to nursery stock.	2	12	27.27	4	9.09	11	25.00	17	38.64	1.75

*Percentage based on usable responses.

TABLE XXXIX (continued)

Selected Competencies	Response Omitted	Ratings of Importance: Not Required		Slightly Important		Considerable Importance		Critical Importance		Mean Importance
	N	N	%*	N	%*	N	%*	N	%*	
43. Maintenance of effective working relationships between employer & employee.	1	2	4.45	2	4.45	13	28.89	28	62.22	2.49
44. Organizing and supervising work crew.	1	3	6.67	-	-	15	33.33	27	60.00	2.47
45. Understanding basic business accounting.	2	9	20.46	9	20.46	15	34.09	11	25.00	1.64
46. Understanding and using proper techniques of selling.	1	8	17.78	6	13.33	14	31.11	17	37.78	1.89
47. Understanding the principles of effective customer relations.	1	7	15.56	4	8.89	11	24.44	23	51.11	2.11
48. Understanding and using effective communication skills.	1	5	11.11	3	6.67	14	31.11	23	51.11	2.22
49. Maintenance of effective working relationships with fellow workers.	2	4	9.09	2	4.55	12	27.27	26	59.09	2.36
50. Planning a landscape design.	3	13	30.23	5	11.63	12	27.91	13	30.23	1.58
51. Proper use of lettering and rendering techniques in designs.	2	19	43.18	8	18.18	8	18.18	9	20.46	1.16
52. Estimating time and cost for landscaping contract jobs.	2	16	36.36	6	13.64	4	9.09	18	40.91	1.45
53. Advising customers on landscape planning problems.	2	13	29.55	6	13.64	8	18.18	17	38.64	1.66
54. Selling landscape designs.	2	20	45.45	4	9.09	7	15.91	13	29.55	1.30
55. Interpretation of plans, specifications, and contracts.	2	14	31.82	5	11.86	6	13.64	19	43.18	1.68

*Percentages based on usable responses.

TABLE XL

IMPORTANCE OF FIFTY-FIVE SELECTED COMPETENCIES
AS RATED BY THIRTY EMPLOYERS

Selected Competencies	Response Omitted	Ratings of Importance								Mean Importance
		Not Required		Slightly Important		Considerable Importance		Critical Importance		
	N	N	%*	N	%*	N	%*	N	%*	
1. Identification and cultural requirements of landscape plants.	3	1	3.70	1	3.70	20	74.07	5	18.52	2.07
2. Identification of diseases, insects, and other pests.	2	1	3.57	11	39.29	11	39.29	5	17.55	1.71
3. Identification of nutrient deficiencies in landscape plants.	3	4	14.82	11	40.74	9	33.33	3	11.11	1.41
4. Planning disease and insect control programs.	3	4	14.82	12	44.44	8	29.63	3	11.11	1.37
5. Planning programs for supplying nutrient needs for landscape plants.	4	8	30.77	7	26.92	9	34.62	2	7.69	1.19
6. Advising customers on desirable varieties of landscape plants and their costs.	3	6	22.22	7	25.93	8	29.63	6	22.22	1.52
7. Selling horticultural plants and supplies.	3	10	37.04	2	7.41	7	25.93	8	29.63	1.48
8. Growing and care of sod in the sod producing nursery.	2	24	85.71	2	7.14	1	3.57	1	3.57	0.25
9. Establishing, caring for, and restoring lawns.	3	4	14.82	8	29.63	11	40.74	4	14.81	1.56
10. Pruning landscape plants.	2	1	3.57	6	21.43	13	46.43	8	28.57	2.00
11. Planting and removal of landscape plantings.	2	2	7.14	5	17.86	9	32.14	12	42.87	2.11
12. Performing tree surgery.	2	15	53.57	7	25.00	4	14.29	2	7.14	0.75
13. Identifying weeds affecting landscape plantings.	2	6	21.43	10	35.71	10	35.71	2	7.14	1.29
14. Planning programs for weed control - chem. & cultural.	2	9	32.14	8	28.57	8	28.57	3	10.72	1.18
15. Maintaining, adjusting, repairing, and caring for mechanical equipment.	3	8	29.63	3	11.11	10	37.04	6	22.22	1.52

*Percentage based on usable response.

TABLE XL (continued)

Selected Competencies	Response Omitted	Ratings of Importance: Not Required		Slightly Important		Considerable Importance		Critical Importance		Mean Importance
	N	N	%*	N	%*	N	%*	N	%*	
16. Balling and burlapping trees and shrubs.	2	6	21.43	7	25.00	10	35.71	5	17.86	1.50
17. Shipping and storing landscape plants.	2	11	39.29	8	28.57	6	21.43	3	10.71	1.04
18. Propagation of landscape plants.	3	21	77.78	4	14.82	2	7.41	-	-	0.30
19. Identification and cultural requirements of bedding plants, bulbs, and herbaceous perennials.	2	15	53.57	6	21.43	6	21.43	1	3.57	0.75
20. Identifying agricultural chemicals - their function, use, and toxic effects for landscape plants.	1	7	24.14	13	44.83	7	24.14	2	6.89	1.14
21. Determining proper rates, mixing, applying, and safe handling of chemicals.	1	6	20.69	11	37.93	9	31.03	3	10.35	1.31
22. Planning a purchasing program for securing agricultural chemicals.	2	21	75.00	3	10.72	3	10.72	1	3.57	0.43
23. Performing field experiments to develop methods of using agricultural chemicals.	4	24	92.31	1	3.85	1	3.85	-	-	0.12
24. Adjusting and maintaining application equipment.	1	14	48.28	6	20.69	5	17.24	4	13.79	0.97
25. Operating power driven application equipment.	3	13	48.15	8	26.63	4	14.82	2	7.40	1.31
26. Operating hand operated application equipment.	2	10	35.71	7	25.00	9	32.14	2	7.14	1.11
27. Understanding environmental and human hazards associated with agricultural chemicals.	2	7	25.00	7	25.00	7	25.00	7	25.00	1.50
28. Explaining the origin, development, structure, and texture of soils.	2	12	42.86	9	32.14	5	17.86	2	7.14	0.89
29. Explaining soil acidity.	2	10	35.71	9	32.14	7	25.00	2	7.14	1.04

*Percentage based on usable responses.

TABLE XL (continued)

Selected Competencies	Response Omitted	Ratings of Importance								Mean Importance
		Not Required		Slightly Important		Considerable Importance		Critical Importance		
	N	N	%*	N	%*	N	%*	N	%*	
30. Explaining the function of soil nutrients.	2	8	28.57	11	39.29	6	21.43	3	10.71	1.14
31. Taking & testing soil samples and interpreting soil tests.	2	17	60.71	5	17.86	4	14.29	2	7.14	0.68
32. Making fertilizer recommendations on basis of soil tests.	3	15	55.56	4	14.81	5	18.52	3	11.11	0.85
33. Planning proper use and application of organic and mineral fertilizers.	2	10	35.71	4	14.29	10	35.71	4	14.29	1.29
34. Planning and determining cost of soil fertility build-up program.	2	19	67.86	3	10.71	4	14.29	2	7.14	0.61
35. Planning & determining cost of maintaining a balanced soil fertility program.	2	19	67.86	3	10.71	4	14.29	2	7.14	0.61
36. Planning a program of soil erosion control.	2	20	71.43	5	17.86	2	7.14	1	3.57	0.42
37. Determining need for and planning drainage systems.	2	12	42.86	6	21.43	6	21.43	4	14.28	1.07
38. Determining need for and planning irrigation systems.	1	21	72.41	3	10.35	1	3.45	4	13.79	0.59
39. Understanding the use of financial records in the business.	2	13	46.43	5	17.85	6	21.43	4	14.29	1.04
40. Understanding the proper use of inventory and rotation records.	2	16	57.14	2	7.14	6	21.43	4	14.29	0.93
41. Understanding the regulations pertaining to hired labor.	2	6	21.43	6	21.43	11	39.29	5	17.85	1.54
42. Understanding the regulations pertaining to nursery stock.	2	8	28.57	7	25.00	9	32.14	4	14.29	1.32

*Percentage based on usable responses.

TABLE XL (continued)

Selected Competencies	Response Omitted	Ratings of Importance: Not Required		Slightly Important		Considerable Importance		Critical Importance		Mean Importance
	N	N	%*	N	%*	N	%*	N	%*	
43. Maintenance of effective working relationships between employer & employee.	1	1	3.45	3	10.35	12	43.38	13	44.82	2.28
44. Organizing and supervising work crew.	2	3	10.72	-	-	16	57.14	9	32.14	2.11
45. Understanding basic business accounting.	3	13	48.15	6	22.22	6	22.22	2	7.41	0.89
46. Understanding and using proper techniques of selling.	4	8	30.77	2	7.69	7	26.92	9	34.62	1.65
47. Understanding the principles of effective customer relations.	2	4	14.29	1	3.57	14	50.00	9	32.14	2.00
48. Understanding and using effective communication skills.	3	2	7.41	1	3.70	14	51.85	10	37.04	2.19
49. Maintenance of effective working relationships with fellow workers.	1	-	-	-	-	15	51.72	14	48.28	2.48
50. Planning a landscape design.	2	6	21.43	7	25.00	8	28.57	7	25.00	1.57
51. Proper use of lettering and rendering techniques in designs.	1	12	41.38	4	13.79	7	24.14	6	20.69	1.24
52. Estimating time and cost for landscaping contract jobs.	2	7	25.00	4	14.29	11	39.29	6	21.42	1.57
53. Advising customers on landscape planning problems.	3	10	37.04	2	7.41	10	37.04	5	18.51	1.37
54. Selling landscape designs.	3	13	48.15	2	7.41	9	33.33	3	11.11	1.07
55. Interpretation of plans, specifications, and contracts.	2	7	25.00	2	7.14	12	42.86	7	25.00	1.64

*Percentages based on usable responses.

thirty per cent or more of them also rated these competencies "not required."

7. Selling horticultural plants and supplies.

39. Understanding the use of financial records in the business.

50. Planning a landscape design.

52. Estimating time and cost for landscape contract jobs.

53. Advising customers on landscape planning problems.

54. Selling landscape designs.

55. Interpretation of plans, specifications, and contracts.

On the other hand, Table XL indicates that competency 46, understanding and using proper techniques of selling, and competency 7, selling horticultural plants and supplies, were rated critically important by approximately 30 per cent or more of the employers while also being rated "not required" by approximately 30 per cent or more of the employers. However, equal or nearly equal numbers of the employers checked the four ratings of importance when they rated each of the following competencies.

6. Advising customers on desirable varieties of landscape plants and their costs.

27. Understanding environmental and human hazards associated with agricultural chemical.

50. Planning a landscape design.

Further examination of Tables XXXIX and XL reveals that 40 per cent or more of the former students rated the following competencies as critically important.

1. Identification and cultural requirements of landscape plants.

6. Advising customers on desirable varieties of landscape plants and their costs.

7. Selling horticultural plants and supplies.

41. Understanding the regulations pertaining to hired labor.

43. Maintenance of effective working relationships between employer and employee.

44. Organizing and supervising work crew.

47. Understanding the principles of effective customer relations.

48. Understanding and using effective communication skills.

49. Maintenance of effective working relationships with fellow workers.

52. Estimating time and cost for landscaping contract jobs.

55. Interpretation of plans, specifications, and contracts.

Forty per cent of the employers rated the following competencies as critically important.

11. Planting and removal of landscape plantings.

43. Maintenance of effective working relationships between employer and employee.

49. Maintenance of effective working relationships with fellow workers.

It can be seen that 43 and 49 are the only competencies indicated as critically important by 40 per cent or more of both the former students and their employers.

It is also revealed in Tables XXXIX and XL that some of the selected competencies are considered "not required" by the respondents. Sixty per cent or more of the former students rated the following competencies as "not required."

8. Growing and care of sod in the sod producing nursery.

12. Performing tree surgery.

18. Propagation of landscape plants.

22. Planning a purchasing program for securing agricultural chemicals.

23. Performing field experiments to develop methods of using agricultural chemicals.

31. Taking and testing soil samples and interpreting soil tests.

34. Planning and determining cost of soil fertility program.

Sixty per cent or more of the employers rated the following competencies as "not required."

8. Growing and care of sod in the sod producing nursery.

18. Propagation of landscape plants.

22. Planning a purchasing program for securing agricultural chemicals.

23. Performing field experiments to develop methods of using agricultural chemicals.

31. Taking and testing soil samples and interpreting soil tests.

34. Planning and determining cost of soil fertility build-up program.

35. Planning and determining cost of maintaining a balanced soil fertility program.

36. Planning a program of soil erosion control.

38. Determining need for and planning an irrigation system.

Thus, 12 is the only competency in the list of competencies rated "not required" by 60 per cent or more of the former students that does not appear in the list of competencies rated as "not required" by 60 per cent or more of the employers. In addition, 60 per cent or more of the employers indicated that competencies 35, 36, and 38 were " not required."

Competencies with mean ratings of 2.00 or above by persistent former students and/or employers are presented in Table XLI. A rating of 2.00 indicates that the competency was judged to have considerable importance for the former student in the satisfactory performance of his present job.

Maintenance of effective working relationships was rated at a high level of importance by both employers and the former students who work for them. Considering all of the fifty-five competencies, former students rated the maintenance of effective working relationships between

TABLE XLI

COMPETENCIES RATED OF CONSIDERABLE IMPORTANCE BY PERSISTENT FORMER STUDENTS AND/OR EMPLOYERS

Competencies	Mean Ratings	
	Former Students	Employers
43. Maintenance of effective working relationships between employer and employee.	2.49	2.28
44. Organizing and supervising work crew.	2.47	2.11
49. Maintenance of effective working relationships with fellow workers.	2.36	2.48
1. Identification and cultural requirements of landscape plants.	2.30	2.07
48. Understanding and using effective communication skills.	2.22	2.19
6. Advising customers on desirable varieties of landscape plants and their costs.	2.17	1.52
10. Pruning landscape plants.	2.15	2.00
41. Understanding the regulations pertaining to hired labor.	2.11	1.54
47. Understanding the principles of effective customer relations.	2.11	2.00
11. Planting and removal of landscape plantings.	1.87	2.11

the employer and employee as the most important competency, while employers considered maintenance of effective working relationships between workers as the most important. The ability to organize and supervise a work crew rated high among former students, and rated well within the range of "considerable importance" among employers.

Substantial disagreement existed between former students and employers on three of the competencies listed in Table XLI. Former students gave a mean rating of 2.17 to the ability to advise customers on desirable varieties of landscape plants and their costs. Employers rated this competency 1.52, thus indicating that employers consider this ability less important than the employees did. A second competency, an understanding of regulations pertaining to hired labor, was rated higher by the former students than by the employers. The former students gave this competency a mean rating of 2.11, while the employers rated it 1.54.

Former students gave a rating of 1.87 to the ability to plant and remove landscape plantings. Employers, however, provided a mean rating of 2.11 for this competency. These ratings indicate that employers consider this competency to be more important for satisfactory employment than the former students do who work for them.

Former students gave a higher mean rating to the importance of identification and cultural requirements of landscape plants than their employers did. Former students provided a mean rating of 2.30 for this competency while their employers rated it 2.07. Former students and their employers rated the competency, understanding and using effective communication, nearly the same. Former students gave this competency a mean rating of 2.22, while their employers rated it 2.19. Two other competencies, 10, pruning landscape plants, and 47, understanding the principles of effective customer relations, were rated of "considerable importance" by both former students and their employers.

The rating system included the categories of "not required" and "slightly important" with numerical values of 0.00 and 1.00, respectively. Competencies with mean ratings within the range of 0.00 to 1.00 were judged to have little importance for satisfactory performance of jobs in the landscape and nursery industry.

An examination of Table XXXIX reveals that former students gave a mean rating of 1.00 or below to eleven of the fifty-five competencies. Their mean ratings and the mean ratings of their employers on the importance of these eleven competencies are summarized in Table XLII. Five additional competencies which the employers rated below 1.00 are also shown in Table XLII.

TABLE XLII

COMPETENCIES RATED OF SLIGHT OR NO IMPORTANCE BY PERSISTENT FORMER STUDENTS AND/OR EMPLOYERS

Competencies	Mean Ratings	
	Former Students	Employers
8. Growing and care of sod in the sod producing nursery.	0.39	0.25
34. Planning and determining cost of soil fertility build-up program.	0.48	0.61
18. Propagation of landscape plants.	0.49	0.30
23. Performing field experiments to develop methods of using agricultural chemicals.	0.51	0.12
31. Taking and testing soil samples and interpreting soil tests.	0.53	0.68
12. Performing tree surgery.	0.64	0.75
35. Planning and determining cost of maintaining a balanced soil fertility program.	0.73	0.61
32. Making fertilizer recommendations on basis of soil tests.	0.76	0.85
22. Planning a purchasing program for securing agricultural chemicals.	0.76	0.43
36. Planning a program of soil erosion control.	0.84	0.42
28. Explaining the origin, development, structure, and texture of soils.	1.00	0.89
38. Determining needs for and planning irrigation systems.	1.05	0.59
19. Identification and cultural requirements of bedding plants, bulbs, and herbaceous perennials.	1.07	0.75
24. Adjusting and maintaining application equipment.	1.07	0.97
40. Understanding the proper use of inventory and rotation records.	1.40	0.93
45. Understanding basic business accounting.	1.64	0.89

Former students considered the ability to grow sod in a sod producing nursery the least important of the fifty-five competencies. They gave it a mean rating of 0.39. Employers also considered this competency to have little importance since their mean rating of it was 0.25. Employers gave their lowest mean rating of importance, 0.12, to the competency, performing field experiments to develop methods of using agricultural chemicals. This competency was rated 0.51 by former students.

The former students and their employers evidenced substantial differences between the mean ratings which they gave to four of the competencies listed in Table XLII. On each of these four, the difference between their mean ratings was 0.40 or more. The competency, planning a program of soil erosion control,received a mean rating of 0.84 from former students and 0.42 from employers. The need for and the planning of irrigation systems was given a mean rating of only 0.59 by employers, but assigned a mean rating of 1.05 by former students. A third competency, involving the proper use of inventory and rotational records, received a mean rating of 1.40 from former students and 0.93 from employers.

The greatest difference between mean ratings was found for competency 45, understanding basic business accounting. Former students allotted it a mean rating of

1.64, a rating near the "considerable importance" range. Employers, on the other hand, rated this competency 0.89. This wide difference beween their mean ratings may be due to employers considering business accounts their responsibility and not the former students' who work for them.

Three other competencies listed in Table XLII showed substantial differences in the mean ratings of importance given them by former students and their employers. Performing field experiments to develop methods of using agricultural chemicals, competency 23, received mean ratings of 0.51 from former students and 0.12 from their employers. Competency 19, identification and cultural requirements of bedding plants, bulbs, and herbaceous perennials, received a mean rating of 1.07 from former students and a mean rating of 0.75 from their employers. A similar difference prevailed for competency 22, planning a purchasing program for securing agricultural chemicals. It was rated 0.76 by the former students and 0.43 by their employers.

An examination of the nine remaining competencies listed in Table XLII reveals, generally speaking, rather moderate differences between the mean ratings given by former students and their employers. Five of these competencies, 28, 31, 32, 34, and 35, concern skills relating to soils and fertility programs; three, 8, 12, and 19, are in the subject area related to plants; and one, competency 24, is in the area of mechanics.

Competencies given mean ratings of importance between 1.00 and 2.00 by both former students and their employers are listed in Table XLIII. Competencies given a mean rating above 2.00 or below 1.00 by either former students or their employers have been reported in either Table XLI or XLII. Thus, while the mean ratings of former students and their employers on the importance of the competencies reported in Table XLIII may vary somewhat, they all fall within the range of 1.00, slight importance, to 2.00, considerable importance.

Evidently, former students tend to place higher importance on the fifty-five competencies considered in this study. Reference to the mean ratings reported in Tables XLI, XLII, and XLIII reveals that former students rated all competencies except 11, 12, 25, 31, 32, 34, 49, 51, and 52, higher than did their employers. One of the competencies, 9, establishing, caring for, and restoring lawns, was rated the same by former students and their employers.

To study the importance of the competencies by categories, the fifty-five selected competencies were grouped into eleven subject areas. The mean ratings for competencies reported in Tables XXXIX and XL were summed according to eleven subject areas as indicated in Table XLIV and the mean for each subject area was determined.

TABLE XLIII

SELECTED COMPETENCIES RATED SLIGHT TO CONSIDERABLE IMPORTANCE BY PERSISTENT FORMER STUDENTS AND EMPLOYERS

Competencies	Mean Ratings	
	Former Students	Employers
2. Identification of diseases, insects, and other pests.	1.83	1.71
3. Identification of nutrient deficiencies in landscape plants.	1.74	1.41
4. Planning disease and insect control programs.	1.48	1.37
5. Planning programs for supplying nutrient needs for landscape plants.	1.50	1.19
7. Selling horticultural plants and supplies.	1.67	1.48
13. Identifying weeds affecting landscape plantings.	1.50	1.29
14. Planning programs for weed control -- chemical and cultural.	1.50	1.18
15. Maintaining, adjusting, repairing, and caring for mechanical equipment.	1.73	1.52
16. Balling and burlapping trees and shrubs.	1.59	1.50
17. Shipping and storing landscape plants.	1.28	1.04
20. Identifying agricultural chemicals -- their function, use, and toxic effects for landscape plants.	1.59	1.14
21. Determining proper rates, mixing, applying, and safe handling of chemicals.	1.83	1.31
25. Operating power driven application equipment.	1.13	1.31
26. Operating hand operated application equipment.	1.27	1.11
27. Understanding environmental and human hazards associated with agricultural chemicals.	1.91	1.50

TABLE XLIII (continued)

Competencies	Mean Ratings	
	Former Students	Employers
29. Explaining soil acidity.	1.18	1.04
30. Explaining the function of soil nutrients.	1.27	1.14
33. Planning proper use and application of organic and mineral fertilizers.	1.33	1.29
37. Determining need for and planning drainage system.	1.36	1.07
39. Understanding the use of financial records in the business.	1.63	1.04
42. Understanding the regulations pertaining to nursery stock.	1.75	1.32
46. Understanding and using proper techniques of selling.	1.89	1.65
50. Planning a landscape design.	1.58	1.57
51. Proper use of lettering and rendering techniques in designs.	1.16	1.24
52. Estimating time and cost for landscaping contract jobs.	1.45	1.57
53. Advising customers on landscape planning problems.	1.66	1.37
54. Selling landscape designs.	1.30	1.07
55. Interpretation of plans, specifications, and contracts.	1.68	1.64

TABLE XLIV

IMPORTANCE OF SUBJECT AREAS WITHIN FIFTY-FIVE SELECTED COMPETENCIES

Subject Areas*	Means	
	Former Students	Employers
Working with people (43, 44, 47, 48, and 49)	2.33	2.21
Regulations (41 and 42)	1.93	1.43
Advising and selling to customers (6, 7, 46, 53, and 54)	1.74	1.42
Insects (2 and 4)	1.65	1.54
Accounts and records (39, 40, and 45)	1.55	0.95
Landscape design (50, 51, 52, and 55)	1.47	1.50
Chemicals (20, 21, 22, 23, and 27)	1.32	0.90
Mechanics (15, 24, 25, and 26)	1.30	1.23
Plants (1, 3, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, and 19)	1.23	1.25
Soils (28, 29, 30, 36, 37, and 38)	1.12	0.86
Supplying nutrients (fertilizers) (5, 31, 32, 33, 34, and 35)	0.89	0.87

*Numbers in parentheses are competencies applicable to subject area.

As shown in Table XLIV, persistent former students and their employers agree that the subject area, "working with people," is the most important of the eleven areas. The mean ratings of 2.33 by former students and 2.21 by employers place this subject area within the rating of "considerable importance." Persistent former students and their employers also agree that "supplying nutrients" is the subject area of least importance. Both rate it on the importance scale somewhat below the rating of "slightly important"; thus indicating this area of skills has little use to the former students in satisfactorily performing the requirements of their present jobs.

Employers also indicated that competencies in accounts and records, chemicals, and soils were of little value to the former students in their employ. But former students did not agree with their employers. Former students rated these competencies within the range between "slightly important" and "considerable importance."

Former students and employers registered considerable disagreement on the importance of the subject areas related to advising and selling to customers and regulations. The two groups of respondents agreed closely concerning the importance of the following subject areas: plants, insects, landscape design, mechanics, and supplying nutrients. In all subject areas except landscape design and plants, former students rated the competencies more important than their employers did.

The second hypothesis presented in Chapter I, states that there are significant differences in the ratings of persistent former students and their employers regarding the importance of selected competencies needed by persons in supervisory or technician level positions. To test for significance, the alternate or null form of this hypothesis was stated:

> There are no significant differences in the perceived importance of selected competencies as rated by persistent former students and their employers.

Data for this analysis were obtained from persistent former students and their matched employers. To be included in the analysis, the persistent former student must have been employed in the landscape and nursery industry, returned a completed or nearly completed questionnaire, and his employer must have returned a completed or nearly completed questionnaire. Working within these conditions it was possible to include twenty-six pairs of persistent former students and their matched employers in this analysis. To perserve anonymity of the respondents only numbers indicating pairs of former students and their employers are used to report the findings.

As shown in Table XLV, the MDSTAT computer program determined that seventeen pairs of persistent former students and their employers revealed significant differences between their ratings of importance on the fifty-five selected

TABLE XLV

MEAN RATINGS OF IMPORTANCE AND SIGNIFICANCE OF DIFFERENCES IN MEAN RATINGS BY TWENTY-SIX PAIRS OF PERSISTENT FORMER STUDENTS AND THEIR EMPLOYERS ON FIFTY-FIVE SELECTED COMPETENCIES

Pairs of Former Students and Employers	Mean Ratings		Difference in Means*	Significance of Difference
	Student	Employer		
# 1	1.636	0.618	-1.018	.0005 (S)**
# 2	1.653	1.815	0.129	.4680 (NS)
# 3	2.643	0.962	-1.500	.0005 (S)
# 4	1.527	0.800	-0.727	.0005 (S)
# 5	2.518	1.685	-0.833	.0005 (S)
# 6	1.745	1.537	-0.204	.1540 (NS)
# 7	1.667	0.579	-1.040	.0010 (S)
# 8	1.255	1.236	-0.018	.9030 (NS)
# 9	0.816	1.115	0.486	.0090 (S)
# 10	1.382	1.145	-0.236	.1020 (NS)
# 11	1.927	1.145	-0.782	.0005 (S)
# 12	1.418	0.982	-0.436	.0005 (S)
# 13	1.854	1.382	-0.292	.0210 (S)
# 14	1.527	1.345	-0.182	.1920 (NS)
# 15	1.245	0.982	-0.283	.0060 (S)
# 16	0.891	1.537	0.630	.0010 (S)
# 17	1.437	1.364	-0.109	.4440 (NS)
# 18	0.927	0.818	-0.109	.2610 (NS)
# 19	0.648	0.519	-0.130	.2540 (NS)
# 20	2.036	2.611	0.593	.0005 (S)
# 21	1.200	2.840	1.540	.0005 (S)
# 22	0.833	1.538	0.080	.7230 (NS)
# 23	0.519	0.945	0.407	.0060 (S)
# 24	1.909	1.618	-0.291	.0100 (S)
# 25	1.109	0.582	-0.527	.0005 (S)
# 26	1.636	1.200	-0,436	.0020 (S)

*Difference = Employer's ratings minus former student's ratings.

**Difference considered significant if value is below .0500 level.

competencies. The "difference in means" value was calculated by subtracting the former student's mean from that of his employer. Positive differences indicate that the employer's mean was greater than the former student's.

The difference in mean scores (X) of the twenty-six pairs of former students and employers, Table XLV, were used to calculate the Student's t statistic, resulting in a "t" value of -42.646, significant beyond the .001 level.

$\Sigma X = -5.288$

$\Sigma(X^2) = 10.833$

$\Sigma(X)^2 = 27.963$

degrees of freedom = 50

t significant at .05 level = 2.01

$$\sigma^2 = \frac{\Sigma(X^2) - (\Sigma X)^2/N}{N - 1}$$

$\sigma^2 = .390$

$$t = \frac{X}{\sqrt{\sigma^2/N}}$$

$t = -42.646$

A Student's t value of this magnitude indicates that a significant difference exists across all pairs. On the basis of the statistical tests, the null hypothesis of no difference between importance ratings by former students and their matched employers can not be accepted. It should be noted in Table XLV that nine pairs of persistent former students and their employers exhibited no significant differences between their ratings of importance on the fifty-five selected competencies as determined by the MDSTAT computer program.

The degree of linear association between importance ratings by persistent former students employed in the landscape and nursery industry and their employers was determined by the Pearson product-moment correlation statistic. The capability to calculate this statistic is included in the MDSTAT computer program.

As noted in Table XLVI, the twelfth and fifteenth pairs each have a correlation of $r = .74$, indicating a substantial positive linear relationship between the responses of the persistent former student and his employer. Eight additional pairs have correlations of $r = .60$ or greater, including 13 and 25 with $r = .69$; 4 and 11 with $r = .67$; 14 with $r = .66$; 19 with $r = .62$; 18 with $r = .61$; and 22 with $r = .60$. Correlations of this magnitude indicate good positive association between the responses of former students and their employers. Four pairs with correlations indicating very little similarity between the responses of the employee and his employer include: 3 with $r = .13$; 7 with $r = .24$; 17 with $r = .25$; and 21 with $r = .29$.

When Or Where Employed Persistent Former Students Learned Most About Selected Competencies

Each of the forty-six employed persistent former students was asked to indicate which of the fifty-five competencies he perceived as required for his work and when or where he had learned most about each competency. This information

TABLE XLVI

CORRELATIONS OF IMPORTANCE RATINGS ON FIFTY-FIVE SELECTED COMPETENCIES BETWEEN PERSISTENT FORMER STUDENTS AND THEIR EMPLOYERS

Pairs of Former Students and Employers	Correlation *r*
1	.58
2	.42
3	.13
4	.67
5	.49
6	.55
7	.24
8	.47
9	.42
10	.36
11	.67
12	.74
13	.69
14	.66
15	.74
16	.41
17	.25
18	.61
19	.62
20	.56
21	.29
22	.60
23	.44
24	.57
25	.69
26	.56

was provided by checking one of the following categories for each required competency: (1) no training; (2) before enrolling in program; (3) in agricultural technology courses; (4) during placement training; (5) on-the-job after agricultural technology; and (6) in special schools.

Table XLVII reveals when and where the forty-six former students, presently employed in the landscape and nursery industry, learned most about the fifty-five selected competencies. The percentages in Table XLVII were determined by calculating the ratio of respondents under a category of training to the numbers of persistent former students who perceived a competency to be required for the satisfactory performance of their present jobs.

Former students indicated that they had received no training in thirty-nine or approximately 70 per cent of the fifty-five competencies considered in this study. Of the former students who perceived particular competencies required for the satisfactory performance of their jobs, the number who reported that they had received no training in a competency was usually small. Competencies in which more than ten per cent of the former students reported that they had received no training are listed in Table XLVIII.

Table XLVII also reveals that former students, occasionally learned most about some competencies in special schools. Evidently, this method of securing training

TABLE XLVII

WHEN OR WHERE FORMER STUDENTS EMPLOYED IN THE LANDSCAPE AND NURSERY INDUSTRY LEARNED MOST ABOUT SELECTED COMPETENCIES

Selected Competencies	Perceived Competency as Required	No Training		Learned Before Enrolling In Program		Agricultural Technology Courses		Placement Training		On-the-Job after Ag Technology		In Special Schools	
	N	N	%*	N	%*	N	%*	N	%*	N	%*	N	%*
1. Identification and cultural requirements of landscape plants.	45	-	-	4	8.89	27	60.00	7	15.56	7	15.56	-	-
2. Identification of disease, insects, and other pests.	46	1	2.17	1	2.17	31	67.39	4	8.70	8	17.39	1	2.17
3. Identification of nutrient deficiencies in landscape plants.	41	-	-	5	12.20	25	60.98	4	9.76	5	12.20	2	4.88
4. Planning disease and insect control program.	36	1	2.78	2	5.56	17	47.22	4	11.11	12	33.33	-	-
5. Planning programs for supplying nutrient needs for landscape plants.	37	1	2.70	4	10.81	16	43.24	2	5.41	14	37.84	-	-
6. Advising customers on desirable varieties of landscape plants and their costs.	38	1	2.63	4	10.53	7	18.42	8	21.05	17	44.74	1	2.63
7. Selling horticultural plants and supplies.	31	3	9.68	5	16.13	3	9.68	3	9.68	16	51.61	1	3.23
8. Growing and care of sod in the sod producing nursery.	11	1	9.09	2	18.18	6	54.55	2	18.18	-	-	-	-
9. Establishing, caring for, and restoring lawns.	33	-	-	4	12.12	11	33.33	4	12.12	13	39.39	1	3.03
10. Pruning landscape plants.	44	-	-	14	31.82	4	9.09	11	25.00	15	34.09	-	-
11. Planting and removal of landscape plantings.	37	-	-	11	29.73	5	13.51	7	18.92	14	37.84	-	-
12. Performing tree surgery.	18	-	-	4	22.22	6	33.33	2	11.11	6	33.33	-	-
13. Identifying weeds affecting landscape plantings.	37	1	2.70	5	13.51	16	43.24	5	13.51	10	27.03	-	-

*Percentage based on respondents who perceived competency to be required.

TABLE XLVII (continued)

Selected Competencies	Perceived Competency as Required	No Training		Learned Before Enrolling In Program		Agricultural Technology Courses		Placement Training		On-the-Job after Ag Technology		In Special Schools	
	N	N	%*	N	%*	N	%*	N	%*	N	%*	N	%*
14. Planning programs for weed control -- chemical and cultural.	36	1	2.78	3	8.33	12	33.33	3	8.33	16	44.44	1	2.78
15. Maintaining, adjusting, repairing, and caring for mechanical equipment.	38	4	10.53	11	28.95	4	10.53	2	5.26	17	44.74	-	-
16. Balling and burlapping trees and shrubs.	36	-	-	10	27.78	7	19.44	9	25.00	10	27.78	-	-
17. Shipping and storing landscape plants.	27	-	-	6	22.22	4	14.82	4	14.82	13	48.15	-	-
18. Propagation of landscape plants.	11	-	-	1	9.09	5	45.45	2	18.18	3	27.27	-	-
19. Identification and cultural requirements of bedding plants, bulbs, and herbaceous perennials.	28	-	-	5	17.86	12	42.86	3	10.71	8	28.57	-	-
20. Identifying agricultural chemicals - their function, use, and toxic effects for landscape plants.	34	-	-	5	14.71	10	29.41	3	8.82	15	44.12	1	2.94
21. Determining proper rates, mixing, applying, and safe handling of chemicals.	37	-	-	4	10.81	11	29.73	3	8.11	17	45.95	2	5.41
22. Planning purchasing program for securing agricultural chemicals.	18	1	5.56	2	11.11	1	5.56	1	5.56	13	72.22	-	-
23. Performing field experiments to develop methods of using agricultural chemicals.	12	1	8.33	2	16.67	5	41.67	-	-	4	33.33	-	-
24. Adjusting and maintaining application equipment.	25	2	8.00	4	16.00	3	12.00	1	4.00	15	60.00	-	-

*Percentage based on respondents who perceived competency to be required.

TABLE XLVII (continued)

Selected Competencies	Perceived Competency as Required	No Training		Learned Before Enrolling In Program		Agricultural Technology Courses		Placement Training		On-the-Job after Ag Technology		In Special Schools	
	N	N	%*	N	%*	N	%*	N	%*	N	%*	N	%*
25. Operating power driven application equipment.	26	3	11.54	7	26.92	1	3.85	2	7.69	13	50.00	-	-
26. Operating hand operated application equipment.	32	1	3.13	11	34.38	2	6.25	1	3.13	17	53.13	-	-
27. Understanding environmental and human hazards associated with agricultural chemicals.	40	2	5.00	4	10.00	12	30.00	1	2.50	19	47.50	2	5.00
28. Explaining the origin, development, structure, and texture of soils.	27	1	3.70	2	7.41	20	74.07	1	3.70	2	7.41	1	3.70
29. Explaining soil acidity.	34	2	5.88	1	2.94	24	70.59	1	2.94	5	14.71	1	2.94
30. Explaining the function of soil nutrients.	33	1	3.03	3	9.09	21	63.64	2	6.06	5	15.15	1	3.03
31. Taking and testing soil samples and interpreting soil tests.	13	2	15.39	2	15.39	4	30.77	-	-	5	38.46	-	-
32. Making fertilizer recommendations on basis of soil tests.	21	2	9.52	3	14.29	8	38.10	2	9.52	6	28.57	-	-
33. Planning proper use and application of organic and mineral fertilizers	31	-	-	5	16.13	10	32.26	2	6.45	14	45.16	-	-
34. Planning and determining cost of soil fertility build-up program	14	-	-	1	7.14	3	21.43	2	14.29	8	57.14	-	-
35. Planning and determining cost of maintaining a balanced soil fertility program.	18	1	5.56	1	5.56	6	33.33	2	11.11	8	44.44	-	-
36. Planning a program of soil erosion control.	20	3	15.00	1	5.00	5	25.00	2	10.00	9	45.00	-	-
37. Determining need for and planning a drainage system.	29	3	10.35	2	6.90	5	17.24	1	3.45	18	62.07	-	-

* Percentage based on respondents who perceived competency to be required.

TABLE XLVII (continued)

Selected Competencies	Perceived Competency as Required	No Training		Learned Before Enrolling In Program		Agricultural Technology Courses		Placement Training		On-the-Job after Ag Technology		In Special Schools	
	N	N	%*	N	%*	N	%*	N	%*	N	%*	N	%*
38. Determining need for and planning an irrigation system.	22	4	18.18	5	22.73	3	13.64	1	4.55	8	36.36	1	4.55
39. Understanding the use of financial records in the business.	30	2	6.67	6	20.00	6	20.00	2	2.67	12	40.00	2	2.67
40. Understanding the proper use of inventory and rotational records.	27	-	-	4	14.82	4	14.82	2	7.41	16	59.26	1	3.70
41. Understanding the regulations pertaining to hired labor.	38	1	2.63	4	10.53	2	5.26	3	7.90	27	71.05	1	2.63
42. Understanding the regulations pertaining to nursery stock.	32	2	6.25	3	9.38	4	12.50	1	3.13	21	65.63	1	3.13
43. Maintenance of effective working relationships between employer and employee.	42	7	16.67	5	11.91	3	7.14	4	9.52	23	54.76	-	-
44. Organizing and supervising work crews.	41	2	4.88	6	14.63	-	-	3	7.32	30	73.17	-	-
45. Understanding basic business accounting.	32	2	6.25	5	15.63	13	40.63	1	3.13	10	31.25	1	3.13
46. Understanding and using proper techniques of selling.	36	3	8.33	9	25.00	2	5.56	3	8.33	19	52.78	-	-
47. Understanding the principles of effective customer relations.	37	3	8.11	9	24.32	4	10.81	1	2.70	19	51.35	1	2.70
48. Understanding and using effective communication skills.	40	4	10.00	8	20.00	9	22.50	2	5.00	17	43.50	-	-
49. Maintenance of effective working relationships with fellow workers.	40	3	7.50	8	20.00	1	2.50	2	5.00	26	65.00	-	-

*Percentage based on respondents who perceived competency to be required.

TABLE XLVII (continued)

Selected Competencies	Perceived Competency as Required	No Training		Learned Before Enrolling In Program		Agricultural Technology Courses		Placement Training		On-the-Job after Ag Technology		In Special Schools	
	N	N	%*	N	%*	N	%*	N	%*	N	%*	N	%*
50. Planning a landscape design.	30	-	-	3	10.00	10	33.33	-	-	14	46.67	3	10.00
51. Proper use of lettering and rendering techniques in designs.	25	1	4.00	3	12.00	8	32.00	-	-	10	40.00	3	12.00
52. Estimating time and cost for landscaping contracts.	28	1	3.57	3	10.71	2	7.14	-	-	21	75.00	1	3.57
53. Advising customers on landscape planning problems.	31	3	9.68	2	6.45	6	19.36	1	3.23	18	58.07	1	3.23
54. Selling landscape designs.	24	3	12.50	2	8.33	1	4.17	1	4.17	16	66.67	1	4.17
55. Interpretation of plans, specifications, and contracts.	30	3	10.00	6	20.00	6	20.00	1	3.33	13	43.33	1	3.33

*Percentage based on respondents who perceived competency to be required.

TABLE XLVIII

COMPETENCIES PERCEIVED TO BE REQUIRED ON WHICH TEN PER CENT OR MORE OF CURRENTLY EMPLOYED FORMER STUDENTS REPORTED NO TRAINING

Competencies	Respondents Perceived Competency as Required	Received No Training	
	N	N	%
15. Maintaining, adjusting, repairing, and caring for mechanical equipment.	38	4	10.53
25. Operating power driven application equipment.	26	3	11.54
36. Planning a program of soil erosion control.	20	3	15.00
37. Determining need for and planning a drainage system.	29	3	10.35
38. Determining need for and planning as irrigation system.	22	4	18.18
48. Understanding and using effective communication skills.	40	4	10.00
54. Selling landscape designs.	24	3	12.50
55. Interpretation of plans, specifications, and contracts.	30	3	10.00

is used infrequently. While the findings indicate that special schools received major credit from a few former students for developing twenty-five of the fifty-five competencies listed in Table XLVII, the data reveal that only one former student gave major credit to special schools when nineteen of these twenty-five competencies were being acquired. Conceivably, this former student could have been

the same person since each respondent could repeatedly check the same training agency while indicating when or where he had developed his competencies.

Former students may have learned certain competencies before enrolling in the Landscape and Nursery Technician program. One of the possible responses to the inquiry regarding when or where the former students learned most about a competency was, "before enrolling in program." For each of the fifty-five competencies listed in Table XLVII, at least one former student reported that he had developed the competency before enrolling in the program.

Judging from findings summarized in Table XLIX, former students believed they had acquired many of the competencies required for their employment before they began study in the Landscape and Nursery Technician program. Thirty-four per cent of the thirty-two responding former students indicated that they learned to operate hand operated application equipment, competency 26, before enrolling in the program. Several respondents also indicated that they had acquired two other mechanical competencies before enrollment. Nearly 29 per cent reported that they had developed competency 15, maintaining, adjusting, repairing, and caring for mechanical equipment, and 27 per cent revealed that they had acquired competency 25, operating power driven application equipment before they entered the landscape and nursery program.

TABLE XLIX

COMPETENCIES LEARNED BY TWENTY-FIVE OR MORE PER CENT OF THE PERSISTENT FORMER STUDENTS BEFORE THEY ENROLLED IN THE LANDSCAPE AND NURSERY TECHNICIAN PROGRAM

Competencies	Respondents Perceived Competency as Required	Learned Before Enrolling	
	N	N	%
10. Pruning landscape plants	44	14	31.82
11. Planting and removal of landscape plantings.	37	11	29.73
15. Maintaining, adjusting, repairing, and caring for mechanical equipment.	38	11	28.95
16. Balling and burlapping trees and shrubs.	36	10	27.78
25. Operating power driven application equipment.	26	7	26.92
26. Operating hand operated application equipment.	32	11	34.38
46. Understanding and using proper techniques of selling.	36	9	25.00

Three competencies listed in Table XLIX are related to working with landscape plants. About a third of the respondents revealed that they had learned to prune landscape plants before enrolling. Almost 30 per cent of them indicated that they could make a planting and remove a landscape planting prior to enrollment. Nearly 28 per cent of the former students had learned how to ball and burlap trees and shrubs, before enrolling in the Landscape and Nursery Technician program.

The last competency listed in Table XLIX is 46, understanding and using proper techniques of selling.

Twenty-five per cent of the respondents indicated that they had learned this competency before enrolling in the program.

"On-the-job," the learning acquired through employment after the former students withdrew or completed the Landscape and Nursery Technician program, is an important source of training for the respondents included in this study. An examination of Table XLVII reveals that competency 8, growing and care of sod in a sod producing nursery, is the only competency which the former students were unable to learn to some extent on-the-job. However, only eleven of the former students perceived this competency as required for successful employment.

Fifty per cent or more of the respondents, who perceived these competencies to be required for their jobs, reported that they had learned eighteen of the fifty-five competencies on-the-job. Four of these eighteen competencies are related to advising and selling to customers. More than half of the former students indicated that they had developed competency 7, selling horticultural plants and supplies, and competency 46, understanding and using proper techniques of selling, while on-the-job. Fifty-eight per cent of the respondents learned competency 53, advising customers on landscape planning problems, while on-the-job. Two-thirds of the respondents acquired competency 54, selling

landscape designs, while employed after study in the Landscape and Nursery Technician program.

Four more of the eighteen competencies, which fifty per cent or more of the responding former students indicated that they had acquired on-the-job, are related to working with people. More than 50 per cent of the respondents reported that they had developed competency 46, understanding of the principle of effective customer relations, during employment. Nearly 55 per cent of the respondents revealed that they had acquired competency 43, maintenance of effective working relationships between employers and employees and 73 per cent of them reported that they had developed competency 44, organizing and supervising work crews, while working. Sixty-five per cent of the former students indicated that they learned most about effective working relationships with fellow workers, competency 49, while on-the-job. Although competency 48, understanding and using effective communication skills, cannot be included among the eighteen competencies which 50 per cent or more of the former students learned on-the-job, it seems appropriate to point out in this section, that 43.5 per cent of the informants reported that they had acquired this competency primarily on-the-job.

Three of the eighteen competencies are related to mechanics. According to data in Table XLVII, sixty per cent

of the former students reported that they had learned competency 24, adjusting and maintaining application equipment, during employment. Fifty-three per cent of the former students indicated that they learned competency 26, operating hand operated application equipment, while on-the-job. Half of the former students revealed that they had developed competency 25, operating power driven application equipment while working. Number 15, maintaining, adjusting, repairing, and caring for mechanical equipment, is another competency which may not be included among the eighteen on which 50 per cent or more of the former students had learned, for the greatest part, on-the-job. Still, 45 per cent of the respondents reported that they had learned this competency primarily during employment.

Two more of the eighteen competencies, which 50 per cent or more of the former students indicated they had learned on-the-job, are related to business regulations. Seventy-one per cent of the respondents reported that they had developed competency 41, understanding the regulations pertaining to hired labor, while on-the-job. Approximately, two-thirds of these respondents indicated they had developed competency 42, understanding the regulations pertaining to nursery stock, chiefly on-the-job.

The five remaining competencies of the eighteen which 50 per cent or more of the former students indicated that they had learned principally on-the-job, are listed below along with the percentage of the former students who reported that they had developed each competency mostly while working.

22.	Planning purchasing programs for securing agricultural chemicals.	72.22 per cent
34.	Planning and determining cost of soil fertility build-up program.	57.14 per cent
37.	Determining need for and planning drainage system.	62.07 per cent
40.	Understanding the proper use of inventory and rotational records.	59.26 per cent
52.	Estimating time and cost for landscaping contracts.	75.00 per cent

The reader is reminded again that these percentages were determined by calculating ratios between the number of former students who reported that they developed a competency on-the-job and the number who perceived the competency as required for satisfactory performance on their present jobs.

The findings, which indicate the extent that former students depended on study in agricultural technology courses and on placement training to acquire essential work competencies, represent a major focus of interest in this research. An examination of Table XLVII reveals seven competencies which 50 per cent or more of the former students

reported that they acquired chiefly while enrolled in agricultural technology courses. Three of these competencies are related to soil science. Even though several of the respondents did not perceive these competencies as required for satisfactory performance on their jobs, high percentages of those who did, indicated that they had developed these competencies for the greatest part, in agricultural technology courses. Seventy-four per cent of twenty-seven persisters indicated that they learned the most about competency 28, explaining the origin, development, structure, and texture of soils, while in agricultural technology courses. Nearly 71 per cent of the informants revealed that competency 29, explaining soil acidity, was learned mainly while enrolled in the Institute of Agricultural Technology. About 64 per cent of the respondents reported that competency 30, explaining the functions of soil nutrients, was acquired primarily through agricultural technology courses.

Competency 2, identification of diseases, insects, and other pests, was perceived to be required by all of the forty-six former students who provided data regarding competencies. Sixty-seven per cent of them indicated that they learned most about this competency while in agricultural technology courses. The identification of nutrient deficiencies in landscape plants, competency 3, was learned

in agricultural technology courses by 61 per cent of the forty-one persisters, currently employed, who perceived this competency required for satisfactory performance of their jobs. Sixty per cent of the former students indicated that they had developed competency 1, identification and cultural requirements of landscape plants, chiefly while enrolled in the Institute of Agricultural Technology.

Competency 8, growing and care of sod in a sod producing nursery, is the seventh competency which over 50 per cent of the former students reported that they had developed primarily in agricultural technology courses. It should be pointed out, however, that only eleven of the forty-six employed persisters indicated that this competency is required for satisfactory performance on their jobs. Six or 54.55 per cent of the eleven respondents indicated they learned most about this competency while in agricultural technology courses.

On twenty-six of the competencies, which are listed in Table XLVII, 20 per cent or less of the former students reported that they had acquired these competencies principally from courses in agricultural technology. This percentage is based on the number of former students employed in the industry who perceived a competency to be required for the satisfactory performance of their jobs.

To facilitate their discussion, these twenty-six competencies have been grouped into appropriate subject areas. These subject areas were used to categorize competencies in Table XLIV and they are used again in Table L.

Four of the competencies are categorized under the subject area, "working with people." Forty-one employed persisters indicated that competency 44, organizing and supervising work crews, is required for their jobs, yet they did not report that this competency had been acquired for the greatest part, in agricultural technology courses. Competency 49, maintenance of effective working relationships with fellow workers, is required by forty employed persisters, but only one of these respondents indicated that this competency was learned mainly in agricultural technology courses. Forty-two employed persisters require competency 43, maintenance of effective working relationships between employer and employee, for their jobs, but only seven per cent of them indicated that they learned most about the competency while in agricultural technology courses. Thirty-seven of the respondents reported that they need competency 47, understanding the principles of effective customer relations. Yet, only eleven per cent of them indicated they learned most about this competency in agricultural technology courses.

TABLE L

COMPETENCIES WHICH TWENTY PER CENT OR FEWER OF THE FORMER STUDENTS ACQUIRED PRIMARILY IN AGRICULTURAL TECHNOLOGY COURSES

Subject Areas and Competencies	Respondents Perceived Competency as Required	Acquired in Agricultural Technology Courses	
	N	N	%*
Advising and Selling to Customers			
6, Advising customers on desirable varieties of landscape plants and their costs.	38	7	18.42
7, Selling horticultural plants and supplies.	31	3	9.68
46, Understanding and using proper techniques of selling.	36	2	5.56
53, Advising customers on landscape planning problems.	31	6	19.36
54, Selling landscape designs.	24	1	4.17
Mechanics			
15, Maintaining, adjusting, repairing, and caring for mechanical equipment.	38	4	10.53
24, Adjusting and maintaining application equipment.	25	3	12.00
25, Operating power driven application equipment.	26	1	3.85
26, Operating hand operated application equipment.	32	2	6.25
Working With People			
43, Maintenance of effective working relationships between employers and employees.	42	3	7.14
44, Organizing and supervising work crews.	41	-	-
47, Understanding the principles of effective customer relations.	37	4	10.81
49, Maintenance of effective working relationships with fellow workers.	40	1	2.50

*Percentage based on respondents who perceived competency to be required.

TABLE L (continued)

Subject Areas and Competencies	Respondents Perceived Competency as Required	Acquired in Agricultural Technology Courses	
	N	N	%*
Regulations			
41, Understanding the regulations pertaining to hired labor.	38	2	5.56
42, Understanding the regulations pertaining to nursery stock.	32	4	12.50
Plants			
10, Pruning landscape plants.	44	4	9.09
11, Planting and removal of landscape plantings.	37	5	13.51
16, Balling and burlapping trees and shrubs.	36	7	19.44
17, Shipping and storing landscape plants.	27	4	14.82
Accounts and records			
39, Understanding the use of financial records in the business.	30	6	20.00
40, Understanding the proper use of inventory and rotational records.	27	4	14.82
Soils			
37, Determining need for and planning drainage systems.	29	5	17.24
38, Determining need for and planning an irrigation system.	22	3	13.64
Landscape design			
52, Estimating time and cost for landscaping contract jobs.	28	2	7.14
55, Interpretation of plans, specifications, and contracts.	30	6	20.00

*Percentage based on respondents who perceived competency to be required.

TABLE L (continued)

Subject Areas and Competencies	Respondents Perceived Competency as Required	Acquired in Agricultural Technology Courses	
	N	N	%*
Chemicals			
22, Planning a purchasing program for securing agricultural chemicals.	18	1	5.56
Supplying Nutrients			
(No competencies with values as low as 20 per cent.)			
Insects			
(No competencies with values as low as 20 per cent.)			

*Percentage based on respondents who perceived competency to be required.

According to Table L, no more than a fifth of the former students revealed that they had acquired the five competencies on "advising and selling to customer" while enrolled in agricultural technology courses. The five competencies are listed below along with the percentages of former students who reported that they had acquired the competencies chiefly by enrolling in the Institute of Agricultural Technology.

6. Advising customers on desirable varieties of landscape plants and their costs. — 18.42 per cent

7. Selling horticultural plants and supplies. — 9.68 per cent

46. Understanding and using proper techniques of selling. — 5.56 per cent

53. Advising customers on landscape planning. 19.36 per cent

54. Selling landscape designs. 4.17 per cent

Four competencies are listed under the subject area, mechanics, in Table L. Maintaining, adjusting, repairing, and caring for mechanical equipment, competency 15, is perceived to be required by thirty-eight employed former students, but only four of them acquired this competency primarily in agricultural technology courses.

Twenty-five of the former students perceived competency 24, adjusting and maintaining application equipment, as required for their jobs, yet only three of them reported that they had learned this competency principally while enrolled in agricultural technology. Competency 25, operating power driven application equipment, is perceived to be required for their jobs by twenty-six employed persisters, but again, only one of these respondents indicated that he had learned most about this competency while in agricultural technology courses. Thirty-two of the respondents perceived competency 26, operating hand operated application equipment, as required for their employment, still only two of them indicated that they had developed this competency mostly while taking courses in the agricultural technology.

Two competencies are listed under the subject area, "regulations," in Table L. As presented in this table, thirty-eight former students perceived competency 41,

understanding the regulations pertaining to hired labor, to be required for their work, but only two of them indicated that they learned most about this competency in agricultural technology courses. Thirty-two of the respondents perceived competency 42, understanding the regulations pertaining to nursery stock, to be required for their employment, still only four reported that they acquired this competency chiefly while enrolled in agricultural technology courses.

Four competencies related to working with landscape plants are listed in Table L. Forty-four persistent former students indicated that they were required to have skill in pruning landscape plants, competency 10. However, only four of these informants learned the most about this competency in agricultural technology courses. Planting and removal of landscape plantings, competency 11, is perceived to be required by thirty-seven respondents. Still only five of them learned most about this skill while in agricultural technology courses.

Approximately 19 per cent of thirty-six respondents learned most about competency 16, balling and burlapping trees and shrubs, while in agricultural technology courses. Twenty-seven of the former students reported that competency 17, shipping and storing landscape plants is required for satisfactory performance on their jobs. Nearly 15 per cent of these respondents revealed that they learned most about this competency while in agricultural technology courses.

Twenty per cent of the thirty employed persisters who perceived the competency to be required, learned most about competency 39, understanding the use of financial records in the business, while in the Institute of Agricultural Technology. Twenty-seven of the respondents perceived competency 40, understanding the proper use of inventory and rotational records to be required for their employment. Four of them indicated that they had learned most about this competency in agricultural technology courses.

Twenty-nine of the former students perceived that competency 37, determining the need for and planning drainage systems, was required for their employment, while twenty-two of them recognized that competency 38, determining the need for and planning irrigation systems, was also required for employment. Seventeen per cent of the respondents learned most about competency 37 while taking agricultural technology courses and 14 per cent of them acquired competency 38 primarily in agricultural technology courses.

Two competencies are listed under landscape design in Table L. Twenty-eight employed persisters perceived competency 52, estimating time and cost for landscaping contracts, to be required for employment, but only two of them indicated that they had learned about this competency mostly in agricultural technology courses. Thirty of the respondents perceived competency 55, interpretation of plans,

specifications, and contracts, necessary for their employment, but 20 per cent of them reported that they had developed this competency chiefly by taking courses in the Institute of Agricultural Technology.

Eighteen of the former students indicated that competency 22, planning purchasing program for securing agricultural chemicals, is necessary for employment, but only one of them reported that he had acquired this competency principally while attending agricultural technology classes.

A further examination of Table XLVII reveals the influence on former students of the placement training phase of the Landscape and Nursery Technician program. According to data in Table XLVII, more than 20 per cent of the former students had acquired three of the competencies by participation in the Landscape and Nursery Technician placement training program. Twenty-five of the respondents who perceived that competency 10, pruning landscape plants, was necessary for employment, indicated that they had developed this competency mostly while taking placement training. Nearly 25 per cent of the former students revealed that they had acquired competency 16, balling and burlapping trees and shrubs, principally through the placement training program. About the same percentage of former students reported that they had learned most about

competency 6, advising customers on desirable varieties of landscape plants and their costs, by participating in placement training.

While developing five of the competencies listed in Table XLVII, none of the former students indicated that they had acquired these competencies, for the greatest part, by participating in placement training.

23. Performing field experiments to develop methods of using agricultural chemicals.

31. Taking and testing soil samples and interpreting soil tests.

50. Planning a landscape design.

51. Proper use of lettering and rendering techniques in designs.

52. Estimating time and cost for landscape contracts.

The Landscape and Nursery Technician program in the Institute of Agricultural Technology is a combination of agricultural technology courses and experiences gained while on placement training. In order to determine those competencies which were learned most while enrolled in the Landscape and Nursery Technician program, the values in the "agricultural technology courses" and "placement training" categories of Table XLVII were combined under the eleven subject areas, previously mentioned, to form Table LI.

Inspection of Table LI reveals that eleven competencies were developed primarily while enrolled in the Landscape and Nursery Technician program by 50 per cent or

TABLE LI

PER CENT OF FORMER STUDENTS WHO ACQUIRED COMPETENCIES PRINCIPALLY BY TAKING COURSES IN AGRICULTURAL TECHNOLOGY AND THROUGH PLACEMENT TRAINING

Subject Areas and Competencies	Competency Perceived as Required	Landscape & Nursery Technician Program	
	N	N	%*
Working With People			
43. Maintenance of effective work relationships between employer and employee.	42	7	16.66
44. Organizing and supervising work crews.	41	3	7.32
47. Understanding the principles of effective customer relations.	37	5	13.51
48. Understanding and using effective communication skills.	40	11	27.50
49. Maintenance of effective working relationships with fellow workers.	40	3	7.50
Regulations			
41. Understanding the regulations pertaining to hired labor.	38	5	13.16
42. Understanding the regulations pertaining to nursery stock.	32	5	15.63
Advising and Selling to Customers			
6. Advising customers on desirable varieties of landscape plants and their costs.	38	15	39.47
7. Selling horticultural plants and supplies.	31	6	19.36
46. Understanding and using proper techniques of selling.	36	5	13.89
53. Advising customers on landscape planning problems.	31	7	22.59
54. Interpretation of plans, specification, and contracts.	24	2	8.34

*Percentage based on respondents who perceived competency to be required.

TABLE LI (continued)

Subject Areas and Competencies	Competency Perceived as Required	Landscape & Nursery Technician Program	
	N	N	%*
Insects			
2. Identification of diseases, insects, and other pests.	46	35	76.09
4. Planning disease and insect control programs.	36	21	58.33
Accounts and Records			
39. Understanding the use of financial records in the business.	30	8	22.67
40. Understanding the proper use of inventory and rotational records.	27	6	22.23
45. Understanding basic business accounting.	32	14	43.76
Landscape Design			
50. Planning a landscape design.	30	10	33.33
51. Proper use of lettering and rendering techniques in designs.	25	8	32.00
52. Estimating time and cost for landscape contracts.	28	2	7.14
55. Interpretation of plans, specifications, and contracts.	30	7	23.33
Chemicals			
20. Identifying agricultural chemicals -- their function, use, & toxic effects for land. plants.	34	13	38.23
21. Determining proper rates,mixing, applying, and safe handling of chemicals.	37	14	37.84
22. Planning purchasing program for securing agricultural chemicals.	18	2	11.12
23. Performing field experiments to develop methods of using agricultural chemicals.	12	5	41.67
27. Understanding environmental and human hazards associated with agricultural chemicals.	40	13	32.50

*Percentage based on respondents who perceived competency to be required.

TABLE LI (continued)

Subject Areas and Competencies	Competency Perceived as Required	Landscape & Nursery Technician Program	
	N	N	%*
Mechanics			
15. Maintaining, adjusting, repairing, and caring for mechanical equipment.	38	6	15.79
24. Adjusting and maintaining application equipment.	25	4	16.00
25. Operating power driven application equipment.	26	3	11.54
26. Operating hand operated application equipment.	32	3	9.38
Plants			
1. Identification and cultural requirements of land. plants.	45	34	75.56
3. Identification of nutrient deficiencies in land. plants.	41	29	70.74
8. Growing and care of sod in the sod producing nursery.	11	8	72.73
9. Establishing, caring for, and restoring lawns.	33	15	45.45
10. Pruning landscape plants.	44	15	34.09
11. Planting and removal of landscape plantings.	37	12	32.43
12. Performing tree surgery.	18	8	44.44
13. Identifying weeds affecting landscape plantings.	37	21	56.75
14. Planning programs for weed control -- chemical & cultural.	36	15	41.66
16. Balling and burlapping trees and shrubs.	36	16	44.44
17. Shipping and storing landscape plants.	27	8	39.64
18. Propagation of landscape plants.	11	7	63.63
19. Identification and cultural requirements of bedding plants, bulbs, & herbaceous perennials.	28	15	53.57

*Percentage based on respondents who perceived competency to be required.

TABLE LI (continued)

Subject Areas and Competencies	Competency Perceived as Required	Landscape & Nursery Technician Program	
	N	N	%*
Soils			
28. Explaining the origin, development, structure, and texture of soils.	27	21	77.77
29. Explaining soil acidity.	34	25	73.53
30. Explaining the function of soil nutrients.	33	23	69.70
36. Planning a program of soil erosion control.	20	7	35.00
37. Determining need for and planning drainage systems.	29	6	20.69
38. Determining need for and planning irrigation systems.	22	4	18.19
Supplying Nutrients (fertilizers)			
5. Planning programs for supplying nutrient needs for landscape plants.	37	18	48.65
31. Taking and testing soil samples and interpreting soil tests.	13	4	30.77
32. Making fertilizer recommendations on basis of soil tests.	21	10	47.62
33. Planning proper use and application of organic and mineral fertilizers.	31	12	38.71
34. Planning and determining cost of soil fertility build-up program.	14	5	35.72
35. Planning and determining cost of maintaining a balanced soil fertility program.	18	8	44.44

*Percentage based on respondents who perceived competency to be required.

more of the respondents. Further inspection reveals that six of the eleven competencies are in the subject area related to plants.

1. Identification and cultural requirements of landscape plants.	75.56 per cent
3. Identification of nutrient deficiencies in landscape plants.	70.74 per cent
8. Growing and care of sod in the sod producing nursery.	72.73 per cent
13. Identifying weeds affecting landscape plantings.	56.75 per cent
18. Propagation of landscape plants.	63.63 per cent
19. Identification and cultural requirements of bedding plants, bulbs, and herbaceous perennials.	53.57 per cent

Three of the eleven competencies on which 50 per cent or more of the respondents indicated they had developed primarily while enrolled in the Landscape and Nursery Technician program, are in the "soils" area.

28. Explaining the origin, development, structure, and texture of soils.	77.77 per cent
29. Explaining soil acidity.	73.53 per cent
30. Explaining the function of soil nutrients.	69.70 per cent

Two of the eleven competencies are in the "insects" area.

2. Identification of diseases, insects, and other pests.	76.09 per cent
4. Planning disease and insect control programs.	58.33 per cent

Competencies Needed By Supervisory Or Technician Level Personnel, But Not Provided To Former Students While They Were Enrolled In The Technician Program.

For the purpose of this study, technician level personnel are those persons with technical training in the landscape and nursery industry. Supervisory personnel are technically trained persons with supervisory responsibilities in the business. Neither supervisory nor technician level personnel would be expected to have active roles in the management of the landscape and nursery business.

To determine competencies needed by supervisory or technician personnel, but not provided to former students while they were enrolled in the technician program, appropriate data from Table XLI, Competencies Rated of Considerable Importance by Persistent Former Students and/or Employers, and Table XLVII, When or Where Former Students Employed in the Landscape and Nursery Industry Learned Most About Selected Competencies, were combined in Table LII.

Even though the former students and their employers generally agreed that the ten competencies listed in

TABLE LII

WHEN OR WHERE SELECTED COMPETENCIES JUDGED OF MOST IMPORTANCE WERE LEARNED BY PERSISTENT FORMER STUDENTS

Competencies	Mean Ratings of Importance		Where Learned Most About Competency
	Former Student	Employer	
43. Maintenance of effective working relations between employer and employee.	2.49	2.28	On-the-job
44. Organizing and supervising work crews.	2.47	2.11	On-the-job
49. Maintenance of effective working relations with fellow workers.	2.36	2.48	On-the-job
1. Identification and cultural requirements of landscape plants.	2.30	2.07	L & N Prog.*
48. Understanding and using effective communication skills.	2.22	2.19	On-the-job
6. Advising customers on desirable varieties of landscape plants and their cost.	2.17	1.52	On-the-job
10. Pruning landscape plants.	2.15	2.00	Before enrolling; L & N Prog.*; & On-the-job
41. Understanding the regulations pertaining to hired labor.	2.11	1.54	On-the-job
47. Understanding the principles of effective customer relations.	2.11	2.00	On-the-job
11. Planting and removal of landscape plantings.	1.87	2.11	Before enrolling; L & N Prog.*; & On-the-job

*Landscape and Nursery Technician program.

Table LII are most important for successful employment of the former students, the former students indicated that they had learned most about only one of the competencies, identification and cultural requirements of landscape plants, while enrolled in the Landscape and Nursery Technician program.

Seven of the ten competencies were perceived to have been learned principally while on-the-job.

6. Advising customers on desirable varieties of landscape plants and their costs.

41. Understanding the regulations pertaining to hired labor.

43. Maintenance of effective working relations between employer and employee.

44. Organizing and supervising work crews.

47. Understanding the principles of effective customer relations.

48. Understanding and using effective communication skills.

49. Maintenance of effective working relations with fellow workers.

The two remaining competencies in Table LII concern working with plants. Both competency 10, pruning landscape plants, and competency 11, planting and removal of landscape plantings, were perceived to have been learned by approximately equal percentages of employed persisters before enrolling in the program, while in the Landscape and Nursery Technician program, and while on-the-job, after leaving the program.

Ability Of Persistent Former Students To Perform Selected Competencies.

Persistent former students employed in the landscape and nursery industry were asked to rate their abilities to perform each of the fifty-five selected competencies which they perceived to be required for their present jobs. Employers were also asked to rate the abilities of persistent former students in their employ to perform those competencies which the employers perceived to be required. The rating levels and numerical values placed on the rating levels are as follows: no ability = 1.0; needs improvement = 2.0; satisfactory ability = 3.0; and outstanding ability = 4.0. The data provided by the forty-six persistent former students concerning their abilities to perform fifty-five selected competencies are summarized in Table LIII. Data from thirty employers revealing their perceptions of the abilities of their employees are presented in Table LIV.

Study of Tables LIII and LIV reveals ten competencies on which former students were given mean ability ratings at the "satisfactory ability" level. These ten competencies are listed in Table LV. The mean ability ratings were derived from the former students' self-assessments of their abilities to perform the competencies as well as their employers' assessments of their abilities. Four of these ten competencies were rated at the satisfactory ability level by both the former students and their employers.

TABLE LIII

ABILITY TO PERFORM FIFTY-FIVE SELECTED COMPETENCIES AS PERCEIVED BY FORTY-SIX PERSISTENT FORMER STUDENTS

Selected Competencies	Perceived Competency as Required	Ratings of Ability								Mean Ratings of Ability
		No Ability (1.0)		Needs Improvement (2.0)		Satisfactory Ability (3.0)		Outstanding Ability (4.0)		
	N	N	%*	N	%*	N	%*	N	%*	
1. Identification and cultural requirements of landscape plants.	45	-	-	10	22.22	32	71.11	3	6.67	2.84
2. Identification of diseases, insects, and other pests.	46	2	4.35	25	54.35	19	41.30	-	-	2.63
3. Identification of nutrient deficiencies in landscape plants.	41	-	-	26	63.42	15	36.58	-	-	2.37
4. Planning disease and insect control programs.	36	3	8.33	14	38.89	19	52.78	-	-	2.44
5. Planning programs for supplying nutrient needs for landscape plants.	37	1	2.70	14	37.84	22	59.46	-	-	2.57
6. Advising customers on desirable varieties of landscape plants and their costs.	38	-	-	7	18.42	24	63.16	7	18.42	3.00
7. Selling horticultural plants and supplies.	31	1	3.23	10	32.26	16	51.61	4	12.90	2.74
8. Growing and care of sod in the sod producing nursery.	11	2	18.18	5	45.45	4	36.36	-	-	2.18
9. Establishing, caring for, and restoring lawns.	33	1	3.03	7	21.21	20	60.61	5	15.15	2.88
10. Pruning landscape plants.	43	-	-	3	6.98	28	65.12	12	27.90	3.21
11. Planting and removal of landscape plantings.	36	-	-	4	11.11	20	55.56	12	33.33	3.22
12. Performing tree surgery.	18	1	5.56	5	27.78	11	61.11	1	5.55	2.67
13. Identifying weeds affecting landscape plantings.	36	3	8.33	18	50.00	13	36.11	2	5.56	2.39
14. Planning programs for weed control - chemical & cultural.	36	2	5.56	13	36.11	20	55.56	1	2.77	2.56
15. Maintaining, adjusting, repairing, and caring for mechanical equipment.	38	3	7.90	14	36.84	17	44.74	4	10.52	2.58

*Percentage based on responses indicating competency required.

TABLE LIII (continued)

Selected Competencies	Perceived Competency as Required	Ratings of Ability								Mean Ratings of Ability
		No Ability (1.0)		Needs Improvement (2.0)		Satisfactory Ability (3.0)		Outstanding Ability (4.0)		
	N	N	%*	N	%*	N	%*	N	%*	
16. Balling and burlapping trees and shrubs.	35	1	2.86	6	17.14	18	51.43	10	28.57	3.06
17. Shipping and storing landscape plants.	27	-	-	5	18.52	17	62.96	5	18.52	3.00
18. Propagation of landscape plants.	11	1	9.09	5	45.45	5	45.45	-	-	2.36
19. Identification and cultural requirements of bedding plants, bulbs, and herbaceous perennials.	28	1	3.57	10	35.71	16	57.15	1	3.57	2.61
20. Identifying agricultural chemicals - their function, use, and toxic effects for landscape plants.	34	1	2.94	16	47.06	16	47.06	1	2.94	2.50
21. Determining proper rates, mixing, applying, and safe handling of chemicals.	37	-	-	11	29.73	23	62.16	3	8.11	2.78
22. Planning a purchasing program for securing agricultural chemicals.	18	3	16.67	7	38.89	6	33.33	2	11.11	2.39
23. Performing field experiments to develop methods of using agricultural chemicals.	12	2	16.67	6	50.00	3	25.00	1	8.33	2.25
24. Adjusting and maintaining application equipment.	25	2	8.00	11	44.44	7	28.00	5	20.00	2.60
25. Operating power driven application equipment.	26	1	3.85	7	26.92	12	46.15	6	23.08	2.89
26. Operating hand operated application equipment.	32	-	-	4	12.50	26	81.25	2	6.25	2.94
27. Understanding environmental and human hazards associated with agricultural chemicals.	40	1	2.50	11	27.50	24	60.00	4	10.00	2.78
28. Explaining the origin, development, structure, and texture of soils.	27	3	11.11	9	33.33	13	48.15	2	7.41	2.52
29. Explaining soil acidity.	34	4	11.77	8	23.53	20	58.82	2	5.88	2.59

*Percentage based on responses indicating competency required.

TABLE LIII (continued)

Selected Competencies	Perceived Competency as Required	Ratings of Ability								Mean Ratings of Ability
		No Ability (1.0)		Needs Improvement (2.0)		Satisfactory Ability (3.0)		Outstanding Ability (4.0)		
	N	N	%*	N	%*	N	%*	N	%*	
30. Explaining the function of soil nutrients.	33	3	9.09	9	27.27	20	60.61	1	3.03	2.58
31. Taking and testing soil samples and interpreting soil tests.	13	4	30.77	5	38.46	4	30.77	-	-	2.00
32. Making fertilizer recommendations on basis of soil tests.	21	5	23.81	5	23.81	10	47.62	1	4.76	2.33
33. Planning proper use and application of organic and mineral fertilizers.	30	-	-	11	36.67	16	53.33	3	10.00	2.73
34. Planning and determining cost of soil fertility build-up program.	14	3	21.43	6	42.87	3	21.43	2	14.28	2.29
35. Planning and determining cost of maintaining a balanced soil fertility program.	18	3	16.67	4	22.22	9	50.00	2	11.11	2.56
36. Planning program of soil erosion control.	19	3	15.79	1	5.26	13	68.42	2	10.53	2.74
37. Determining need for and planning drainage systems.	28	3	10.71	7	25.00	14	50.00	4	14.29	2.68
38. Determining need for and planning irrigation systems.	21	4	19.05	8	38.10	8	38.10	1	4.75	2.29
39. Understanding the use of financial records in the business.	29	3	10.35	10	34.48	16	55.17	-	-	2.45
40. Understanding the proper use of inventory and rotation records.	26	2	7.69	7	26.92	16	61.54	1	3.85	2.62
41. Understanding the regulations pertaining to hired labor.	37	1	2.70	8	21.62	25	67.57	3	8.11	2.81
42. Understanding the regulations pertaining to nursery stock.	31	1	3.23	3	9.68	25	80.65	2	6.44	2.90
43. Maintenance of effective working relations between employer and employee.	43	2	4.65	6	13.95	27	62.79	8	18.61	2.95
44. Organizing and supervising work crew.	42	1	2.38	8	19.05	25	59.52	8	19.05	2.95

*Percentage based on responses indicating competency required.

TABLE LIII (continued)

Selected Competencies	Perceived Competency as Required	Ratings of Ability								Mean Ratings of Ability
		No Ability (1.0)		Needs Improvement (2.0)		Satisfactory Ability (3.0)		Outstanding Ability (4.0)		
	N	N	%*	N	%*	N	%*	N	%*	
45. Understanding basic business accounting.	33	2	6.06	11	33.33	19	57.58	1	3.03	2.58
46. Understanding and using proper techniques of selling.	37	2	5.41	11	29.73	19	51.35	5	13.51	2.73
47. Understanding the principles of effective customer relations.	38	1	2.63	5	13.16	28	73.68	4	10.53	2.79
48. Understanding and using effective communication skills.	40	1	2.50	14	35.00	21	52.50	4	10.00	2.70
49. Maintenance of effective working relations with fellow workers.	40	-	-	6	15.00	28	70.00	6	15.00	3.00
50. Planning a landscape design.	30	-	-	8	26.67	16	53.33	6	20.00	2.93
51. Proper use of lettering and rendering techniques in design.	25	3	12.00	8	32.00	11	44.00	3	12.00	2.56
52. Estimating time and cost for landscaping contract jobs.	28	1	3.57	7	25.00	17	60.71	3	10.72	2.79
53. Advising customers on landscape planning problems.	31	3	9.68	3	9.68	21	67.74	4	12.90	2.84
54. Selling landscape designs.	24	2	8.33	7	29.17	13	54.17	2	8.33	2.62
55. Interpretation of plans, specifications, and contracts.	30	2	6.67	4	13.33	21	70.00	3	10.00	2.83

*Percentage based on responses indicating competency required.

TABLE LIV

ABILITY OF PERSISTENT FORMER STUDENTS TO PERFORM FIFTY-FIVE SELECTED COMPETENCIES AS PERCEIVED BY THIRTY EMPLOYERS

Selected Competencies	Perceived Competency as Required	Ratings of Ability								Mean Ratings of Ability
		No Ability (1.0)		Needs Improvement (2.0)		Satisfactory Ability (3.0)		Outstanding Ability (4.0)		
	N	N	%*	N	%*	N	%*	N	%*	
1. Identification and cultural requirements of landscape plants.	26	-	-	7	26.92	17	65.39	2	7.69	2.81
2. Identification of diseases, insects, and other pests.	27	1	3.70	11	40.74	15	55.56	-	-	2.52
3. Identification of nutrient deficiencies in landscape plants.	23	3	13.04	8	34.78	11	47.83	1	4.35	2.44
4. Planning disease and insect control programs.	23	1	4.35	8	34.78	14	60.87	-	-	2.57
5. Planning programs for supplying nutrient needs for landscape plants.	18	1	5.56	6	33.33	10	55.56	1	5.56	2.61
6. Advising customers on desirable varieties of landscape plants and their costs.	21	1	4.76	2	9.52	14	66.67	4	19.05	3.00
7. Selling horticultural plants and supplies.	17	1	5.88	5	29.41	7	41.18	4	23.53	2.82
8. Growing and care of sod in the sod producing nursery.	4	-	-	1	25.00	2	50.00	1	25.00	3.00
9. Establishing, caring for, and restoring lawns.	23	2	8.70	5	21.74	13	56.52	3	13.04	2.74
10. Pruning landscape plants.	27	-	-	6	22.22	17	62.96	4	14.82	2.93
11. Planting and removal of landscape plantings.	26	-	-	4	15.39	16	61.54	6	23.07	3.08
12. Performing tree surgery.	12	-	-	1	8.33	8	66.67	3	25.00	3.17
13. Identifying weeds affecting landscape plantings.	22	2	9.09	5	22.73	15	68.18	-	-	2.59
14. Planning programs for weed control - chemical & cultural.	19	-	-	4	21.05	15	78.95	-	-	2.79
15. Maintaining, adjusting, repairing, and caring for mechanical equipment.	19	1	5.26	6	31.58	10	52.63	2	10.53	2.68

*Percentage based on responses indicating competency required.

TABLE LIV (continued)

Selected Competencies	Perceived Competency as Required	Ratings of Ability								Mean Ratings of Ability
		No Ability (1.0)		Needs Improvement (2.0)		Satisfactory Ability (3.0)		Outstanding Ability (4.0)		
	N	N	%*	N	%*	N	%*	N	%*	
16. Balling and burlapping trees and shrubs.	22	-	-	3	13.64	13	59.09	6	27.27	3.14
17. Shipping and storing landscape plants.	17	1	5.88	5	29.41	10	58.82	1	5.88	2.65
18. Propagation of landscape plants.	6	1	16.67	-	-	5	83.33	-	-	2.67
19. Identification and cultural requirements of bedding plants, bulbs, and herbaceous perennials.	13	1	7.69	6	46.15	6	46.15	-	-	2.39
20. Identifying agricultural chemicals - their function, use, and toxic effects for landscape plants.	22	2	9.09	7	31.82	13	59.09	-	-	2.50
21. Determining proper rates, mixing, applying, and safe handling of chemicals.	22	-	-	7	31.82	12	54.55	3	13.64	2.82
22. Planning a purchasing program for securing agricultural chemicals.	7	1	14.29	3	42.86	3	42.85	-	-	2.29
23. Performing field experiments to develop methods of using agricultural chemicals.	2	1	50.00	-	-	1	50.00	-	-	2.00
24. Adjusting and maintaining application equipment.	15	-	-	3	20.00	12	80.00	-	-	2.80
25. Operating power driven application equipment.	14	-	-	2	14.29	12	85.71	-	-	2.86
26. Operating hand operated application equipment.	18	-	-	2	11.11	16	88.89	-	-	2.89
27. Understanding environmental and human hazards associated with agricultural chemicals.	20	2	10.00	4	20.00	11	55.55	3	15.00	2.75
28. Explaining the origin, development, structure, and texture of soils.	16	2	12.50	6	37.50	8	50.00	-	-	2.38
29. Explaining soil acidity.	18	2	11.11	4	22.22	12	66.67	-	-	2.56

*Percentage based on responses indicating competency required.

TABLE LIV (continued)

Selected Competencies	Perceived Competency as Required	Ratings of Ability								Mean Ratings of Ability
		No Ability (1.0)		Needs Improvement (2.0)		Satisfactory Ability (3.0)		Outstanding Ability (4.0)		
	N	N	%*	N	%*	N	%*	N	%*	
30. Explaining the function of soil nutrients.	19	1	5.26	6	31.58	12	63.16	-	-	2.58
31. Taking and testing soil samples and interpreting soil tests.	11	3	27.27	1	9.09	7	63.64	-	-	2.36
32. Making fertilizer recommendations on basis of soil tests.	12	3	25.00	2	16.67	7	58.33	-	-	2.33
33. Planning proper use and application of organic and mineral fertilizers.	18	2	11.11	5	27.78	11	61.11	-	-	2.50
34. Planning and determining cost of soil fertility build-up program.	9	3	33.33	3	33.33	3	33.33	-	-	2.00
35. Planning and determining cost of maintaining a balanced soil fertility program.	9	3	33.33	3	33.33	3	33.33	-	-	2.00
36. Planning program of soil erosion control.	8	2	25.00	2	25.00	4	50.00	-	-	2.25
37. Determining need for and planning drainage systems.	16	2	12.50	4	25.00	10	62.50	-	-	2.50
38. Determining need for and planning irrigation systems.	8	1	12.50	3	37.50	4	50.00	-	-	2.38
39. Understanding the use of financial records in the business.	15	3	20.00	8	53.33	4	26.67	-	-	2.07
40. Understanding the proper use of inventory and rotation records.	12	1	8.33	7	58.33	2	16.67	2	16.67	2.42
41. Understanding the regulations pertaining to hired labor.	22	2	9.09	5	22.73	15	68.18	-	-	2.59
42. Understanding the regulations pertaining to nursery stock.	20	-	-	3	15.00	17	85.00	-	-	2.85
43. Maintenance of effective working relations between employer and employee.	28	1	3.57	4	14.29	17	60.71	6	21.43	3.00
44. Organizing and supervising work crew.	25	-	-	10	40.00	13	52.00	2	8.00	2.84

*Percentage based on responses indicating competency required.

TABLE LIV (continued)

Selected Competencies	Perceived Competency as Required	Ratings of Ability								Mean Ratings of Ability
		No Ability (1.0)		Needs Improvement (2.0)		Satisfactory Ability (3.0)		Outstanding Ability (4.0)		
	N	N	%*	N	%*	N	%*	N	%*	
45. Understanding basic business accounting.	13	-	-	8	61.54	5	38.46	-	-	2.39
46. Understanding and using proper techniques of selling.	18	1	5.56	6	33.33	9	50.00	2	11.11	2.66
47. Understanding the principles of effective customer relations.	24	1	4.16	4	16.67	15	62.50	4	16.67	2.92
48. Understanding and using effective communication skills.	25	1	4.00	7	28.00	15	60.00	2	8.00	2.72
49. Maintenance of effective working relations with fellow workers.	29	1	3.45	3	10.35	17	58.62	8	27.58	3.10
50. Planning a landscape design.	22	1	4.55	6	27.27	13	59.09	2	9.09	2.73
51. Proper use of lettering and rendering techniques in designs.	17	1	5.88	5	29.41	10	58.83	1	5.88	2.65
52. Estimating time and cost for landscaping contract jobs.	21	1	4.76	8	38.10	11	52.38	1	4.76	2.57
53. Advising customers on landscape planning problems.	17	-	-	2	11.77	12	70.59	3	17.64	3.06
54. Selling landscape designs.	14	-	-	4	28.57	8	57.14	2	14.29	2.86
55. Interpretation of plans, specifications, and contracts.	21	1	4.76	6	28.57	8	38.10	6	28.57	2.91

*Percentage based on responses indicating competency required.

TABLE LV

COMPETENCIES PERFORMED WITH SATISFACTORY ABILITY BY PERSISTENT FORMER STUDENTS ACCORDING TO RATINGS BY THE FORMER STUDENTS AND BY THEIR EMPLOYERS

Subject Areas & Competencies	Mean	
	Former Students	Employers
Plants		
8. Growing and care of sod in the sod producing nursery.	2.18	3.00
10. Pruning landscape plants.	3.21	2.93
11. Planting and removal of landscape plantings.	3.22	3.08
12. Performing tree surgery.	2.67	3.17
16. Ball & Burlapping trees & shrubs.	3.06	3.14
17. Shipping & storing land. plants.	3.00	2.65
Advising Customers		
6. Advising customers on desirable varieties of landscape plants and their cost.	3.00	3.00
53. Advising customers on landscape planning problems.	2.84	3.06
Working with people		
43. Maintenance of effective working relations between employers and employees.	2.95	3.00
49. Maintenance of effective working relations with fellow workers.	3.00	3.10

Six of the ten competencies are included in the "plants" subject area. Two of these, competency 11, planting and removal of landscape plantings, and competency 16, balling and burlapping trees and shrubs, were rated at the satisfactory ability level by both former students and employers. Competencies 10, pruning landscape plants, and 17, shipping and storing landscape plants, were rated at the satisfactory ability level by former students. Employers did not agree

with these ratings since they rated both of these competencies in the upper range of the "needs improvement" level.

The two remaining competencies in the plant subject area include growing sod in a sod producing nursery, competency 8, and performing tree surgery, competency 12. Employers perceived the ability of the former students to perform these competencies to be at a satisfactory level. Former students indicated that they perceived a need for improvement in these two skills.

Two competencies are included in the "advising and selling to customers" subject area. Apparent agreement exists between former students and employers on the abilities of the former students to advise customers on desirable varieties of landscape plants and their costs, competency 6. Former students did not rate their abilities to perform competency 53, advising customers on landscape planning problems, as high as their employers did. The mean ability rating given to competency 53 by former students was 2.84, compared to 3.06 by employers.

The remaining subject area summarized in Table LV, is "working with people" and includes two competencies.

43. Maintenance of effective working relations between employers and employees.

49. Maintenance of effective working relations with fellow workers.

While complete agreement of means between former students

and employers on the abilities to perform these competencies, does not exist, former students are rated near 3.00 on both of these competencies indicating a satisfactory level of abilities.

Referring again to Tables LIII and LIV, it may be observed that the mean ratings of the remaining forty-five competencies fall within the numerical range of 2.00 to 3.00. Mean ratings in this range indicate a need for improvement in competencies which are perceived to be required for the satisfactory performances of former students in their present landscape and nursery industry jobs.

As indicated in Table LIII, none of the former students reported outstanding ability to perform eight of the competencies. Five of these eight competencies are considered to be required by a majority of the persisters.

2. Identification of diseases, insects, and other pests.

3. Identification of nutrient deficiencies in landscape plants.

4. Planning disease and insect control programs.

5. Planning programs for supplying nutrient needs for landscape plants.

39. Understanding the use of financial records in the business.

The three remaining competencies of the eight are required by approximately one-fourth of the persisters.

8. Growing and care of sod in the sod producing nursery.

18. Propagation of landscape plants.

21. Determining proper rates, mixing, applying, and safe handling of chemicals.

Inspection of Table LIV reveals that, according to the employers, none of the former students showed outstanding abilities to perform twenty-seven of the competencies. Seventeen of these competencies were perceived by a majority of the employers to be required for successful performance of the former students in their employ. These seventeen competencies include:

2. Identification of diseases, insects, and other pests.

4. Planning disease and insect control programs.

13. Identifying weeds affecting landscape plantings.

14. Planning programs for weed control -- chemical and cultural.

20. Identifying agricultural chemicals -- their function, use, and toxic effects for landscape plants.

24. Adjusting and maintaining application equipment.

25. Operating power driven application equipment.

26. Operating hand operated application equipment.

28. Explaining the origin, development, structure, and texture of soils.

29. Explaining soil acidity.

30. Explaining the function of soil nutrients.

33. Planning proper use and application of organic and mineral fertilizers.

37. Determining need for and planning drainage systems.

39. Understanding the use of financial records in the business.

41. Understanding the regulations pertaining to hired labor.

42. Understanding the regulations pertaining to nursery stock.

45. Understanding basic business accounting.

Former students gave themselves a mean rating above 2.00 and their employers also gave them a mean rating above 2.00 on their abilities to perform each of the fifty-five competencies considered in this study. However, on each of forty-four of the competencies, at least one of the former students indicated he had no ability to perform the competency and on each of thirty-nine competencies at least one employer indicated that the former student in his employ had no ability to perform the competency.

The third hypothesis presented in Chapter I, states that significant differences exist in the ratings of persistent former students to perform selected competencies. To test for significance, the alternate or null form of this hypothesis was stated:

> There are no significant differences in the ratings of persistent former students and their employers on the abilities of the persistent former students to perform selected competencies.

Data for this analysis were obtained from persistent former students and their matched employers. To be included, the persistent former student must have been employed in the landscape and nursery industry, returned a completed questionnaire, and his employer must have returned a completed or nearly completed questionnaire. Twenty-six pairs of former students and their matched employers qualified under the above conditions. To perserve anonymity of the respondents, only numbers indicating pairs of former students and their employers are used to report the findings.

The MDSTAT computer program determined that seventeen of the pairs of persistent former students and their employers rated the abilities of former students such that significant differences existed in their scores as noted in Table LVI. The "difference in means" value was calculated by subtracting the former student's mean from that of the employer's. Positive differences indicated that the employer's mean was greater than the former student's.

The difference in mean scores (X) of the twenty-six pairs of former students and their employers as determined by the computer program, Table LVI, were used to calculate the Student's t statistic, resulting in a "t" value of -26.606, significant beyond the .001 level.

TABLE LVI

MEAN RATINGS OF ABILITY AND SIGNIFICANCE OF DIFFERENCES IN MEAN RATINGS BY TWENTY-SIX PAIRS OF PERSISTENT FORMER STUDENTS AND THEIR EMPLOYERS

Pairs of Former Students and Employers	Mean Ratings		Difference in Means*	Significance of Difference
	Student	Employer		
1	2.073	1.073	-1.000	.0005 (S)**
2	1.764	1.415	-0.377	.0360 (S)
3	3.524	1.245	-2.048	.0005 (S)
4	2.182	0.863	-1.255	.0005 (S)
5	2.167	2.722	0.556	.0005 (S)
6	2.272	2.352	0.074	.6420 (NS)
7	2.143	0.868	-1.160	.0060 (S)
8	1.855	2.309	0.455	.0310 (S)
9	1.289	1.942	0.865	.0030 (S)
10	2.182	1.945	-0.236	.2880 (NS)
11	2.036	1.945	-0.091	.5830 (NS)
12	1.745	1.164	-0.582	.0005 (S)
13	2.723	1.964	-0.489	.0170 (S)
14	2.241	1.691	-0.574	.0050 (S)
15	1.434	1.345	-0.075	.4980 (NS)
16	1.236	2.407	1.148	.0005 (S)
17	2.582	2.327	-0.255	.2040 (NS)
18	1.250	1.327	0.104	.4900 (NS)
19	1.000	0.778	-0.222	.1980 (NS)
20	1.891	1.907	0.037	.7350 (NS)
21	1.709	2.740	0.880	.0005 (S)
22	1.036	2.346	0.500	.0450 (S)
23	0.741	1.455	0.704	.0010 (S)
24	2.636	2.291	-0.345	.0230 (S)
25	1.455	0.673	-0.782	.0005 (S)
26	1.545	1.855	0.309	.1070 (NS)

*Difference = Employer's ratings minus former student's ratings.

**Difference considered significant if value is below .0500 level.

$\Sigma X = -3.858$

$\Sigma (X^2) = 14.291$

$\Sigma (X)^2 = 14.889$

degrees of freedom = 50

$\underline{t}$ significant at .05 level = 2.01

$$\sigma^2 = \frac{\Sigma(X^2) - (\Sigma X)^2/N}{N - 1}$$

$$\sigma^2 = .548$$

$$\underline{t} = \frac{X}{\sigma^2/N}$$

$$\underline{t} = -26.606$$

A Student's $\underline{t}$ value of this magnitude indicated that a significant difference exists across all pairs. On the basis of the statistical tests, the null hypothesis of no difference between ability ratings by former students and their matched employers cannot be accepted. It should be noted that nine pairs of former students and their employers exhibited no significant differences in responses as calculated by the MDSTAT computer program.

It should be noted that five pairs of persistent former students and their employers, 6, 10, 17, 18, and 19, exhibited no significant differences in their ratings on both "importance", Table XLV, and "ability", Table LVI. These data would tend to indicate that the former student and the employer in each of the five pairs have similar understandings of the present job of the former student and the competencies required to perform the job satisfactorily.

The Pearson product-moment correlation statistic determines the degree of linear association

between persistent former students and their matched employers. The capability to calculate this statistic is included in the MDSTAT computer program.

As noted in Table LVII, the fifteenth pair has an r of .75 and pair 25 has an r of .74. Such values are indicative of substantial positive linear relationships between the responses of the persistent former student and his employer. Good linear relationships seem to be present in the responses of four pairs of former students and their employers: 6 and 11 with $r = .62$, and 12 and 22 with $r = .63$.

Four pairs with correlations indicating very little linear association between the responses include: 3 with a $r = -.09$; 7 with $r = .06$; 10 with $r = .23$; and 26 with $r = .29$.

As a means of determining the quality and quantity of work produced by persistent former students, employers were asked to rate the persisters in their employ in comparison to other employees. Employers were asked to compare former students to other employees with no formal training in the landscape and nursery industry after grouping them according to the following categories of experience: (1) no experience; (2) same number of years of experience as the former student; (3) two years more experience than the former student; or (4) four years

TABLE LVII

CORRELATIONS OF ABILITY RATINGS OF TWENTY-SIX PERSISTENT FORMER STUDENTS ON FIFTY-FIVE SELECTED COMPETENCIES AS RATED BY PERSISTENT FORMER STUDENTS AND THEIR EMPLOYERS

Pairs of Former Students and Employers	Correlations of Ability Ratings r
1	.45
2	.47
3	-.09
4	.45
5	.56
6	.62
7	.06
8	.45
9	.38
10	.23
11	.62
12	.63
13	.52
14	.54
15	.75
16	.45
17	.31
18	.57
19	.59
20	.56
21	.41
22	.63
23	.48
24	.50
25	.74
26	.29

more experience than the former student in the landscape and nursery industry. Employers were asked to use a Likert-type scale with ratings from superior to inferior while rating former students in their employ. A numerical continuum from seven for a superior rating to one for an inferior rating was applied to the scale. The mean for such a rating system is 4.00, and may be interpreted as being equal to the quality or quantity of work produced by other employees in the comparison group.

Data in Table LVIII indicates that former students produce work which is well above the 4.00 level. As would be expected, the ratings of former students decline as the amount of experience increases for the other employees. When compared to other employees with four more years of experience than the former students, ratings of the former students remained above the 5.00 level for both quality and quantity of work produced.

The ability to perform important competencies is essential to the satisfactory performance of an employee in a business. The inability to perform such competencies usually results in low productivity and work of inferior quality. An attempt was made to combine ability to perform a competency with the importance of the competency to the job into a single measurement term, weighted ability.

TABLE LVIII

QUALITY AND QUANTITY OF WORK PERFORMED BY PERSISTENT FORMER STUDENTS AS RATED BY THEIR EMPLOYERS

Comparisons Based on Experience	Mean Rating by All Applicable Respondents*		Number of employers having no one with which to compare the former student
	Quality	Quantity	
Work compared to person with no formal training and:			
No experience	6.41	6.19	2
Same number of years of experience	6.17	6.04	5
Two years more experience	5.79	5.58	10
Four years more experience	5.06	5.41	12

*One employer did not respond, N = 29

Weighted ability may be defined as the product of the numerical rating of ability to perform and the rating of importance of the competencies. By use of a transformation subroutine, the MDSTAT computer program calculated a weighted ability value for each of the fifty-five competencies, but reported only a mean value for the former student and the employer in each of the twenty-six pairs. These calculations are summarized in Table LIX.

Respondents rated the importance of competencies by using a four-item scale: (1) not required = 0; (2) slightly important = 1; (3) considerable importance = 2; and (4) critical importance = 3. The system of scale values which was used to rate the abilities of former students to perform a competency is described on page 165. The product of a rating of the importance of a competency and the rating of a former student to perform the competency could result in a maximum weighted ability of 12 and a minimum of 1. If a respondent indicated that a competency was not required, he did not respond with an ability rating; therefore, only competencies with some level of importance were used in the calculation of the weighted abilities.

Twelve values are possible as calculated products of ability and importance ratings. Four of these values are not duplicated: critical importance and outstanding ability = 12; critical importance and satisfactory

TABLE LIX

WEIGHTED ABILITY* VALUES CALCULATED FROM RESPONSES OF PERSISTENT FORMER STUDENTS AND EMPLOYERS

Pairs of Former Students and Employers	Mean Weighted Ability	
	Student	Employer
1	4.527	1.873
2	4.545	3.132
3	9.524	2.057
4	4.273	1.510
5	5.722	5.481
6	5.018	4.981
7	4.905	1.737
8	4.018	3.582
9	2.763	3.173
10	3.982	3.164
11	5.727	3.164
12	3.782	2.073
13	6.064	4.382
14	4.759	3.927
15	2.660	2.218
16	2.455	4.963
17	4.309	4.327
18	1.750	1.691
19	1.741	1.778
20	4.400	5.611
21	3.436	8.100
22	2.519	4.462
23	1.241	3.018
24	5.509	4.527
25	3.545	1.600
26	3.436	3.055

*Weighted ability = product of numerical rating on ability to perform and rating of importance of competency.

ability = 9; considerable importance and outstanding ability = 8; and slightly important and no ability = 1.

Study of Table LIX reveals that the ratings of a former student and his employer tended to be similar, although there were two exceptions. A former student in the third pair rated himself at 9.524, indicating that he perceived himself as having satisfactory ability to perform competencies of considerable to critical importance. The employer in the third pair did not agree with his employee for his weighted ability value is 2.057, indicating that he considered the former student to have low ability to perform the competencies.

The employer in pair 21 indicated a weighted ability of 8.10. A value of this magnitude would tend to indicate that the competencies were judged to be of considerable importance and the employer perceived the ability of his employee to perform the competencies to be highly satisfactory. The weighted ability of 3.436, calculated with ratings provided by the employee, probably indicates that the employee had a low opinion of the importance of the competencies as well as his ability to perform them.

Weighted ability values in the 1.00 to 2.00 range would indicate that the competencies were of slight importance and the employee had little ability to perform them. Three former students from pairs 18, 19, and 23 had

weighted abilities in this range. Five employers from pairs 1, 4, 7, 19, and 25 indicated weighted abilities in the 1.00 to 2.00 range.

To study the ability of persistent former students to perform the competencies when they were grouped into the eleven subject areas, the means of the competencies as given in Table LIII and LIV were summed according to eleven subject areas. The eleven subject areas and the mean for each are reported in Table LX. Data in LX indicate that persistent former students and their employers agree that the persisters have the highest ability in working with people. The means of 2.88 by former students and 2.92 by employers indicated that the ability of the persisters is approaching the satisfactory level. Generally, former students and employers tend to agree on the level of ability of the persistent former students to perform the competencies included under each of the subject areas listed in Table LX.

TABLE LX

ABILITY OF PERSISTENT FORMER STUDENTS TO PERFORM COMPETENCIES IN ELEVEN SUBJECT AREAS

Subject Areas*	Means	
	Former Students	Employers
Working with people (43,44,47,48, and 49)	2.88	2.92
Regulations (41 and 42)	2.85	2.72
Advising and selling to customers (6,7,46,53, and 54)	2.79	2.88
Landscape design (50,51,52, and 55)	2.78	2.72
Mechanics (15,24,25, and 26)	2.75	2.81
Plants (1,3,8,9,10,11,12,13,14, 16,17,18, and 19)	2.72	2.80
Soils (28,29,30,36,37, and 38)	2.57	2.44
Chemicals (20,21,22,23, and 27)	2.54	2.47
Accounts and records (39,40, and 45)	2.55	2.29
Insects (2 and 4)	2.53	2.55
Supplying nutrients (fertilizers) (5,31,32,33,34, and 35)	2.41	2.30

*Numbers in parentheses are competencies applicable to the Subject Area.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Purpose of Study

This research was concerned with an evaluation of the Landscape and Nursery Technician program at Michigan State University. The objectives of the study were to:

1. Determine the reasons why former students left the program.
2. Ascertain the job history of the former students.
3. Determine the amount, kind, and source of additional formal education received by former students since leaving the program.
4. Determine the ability of the persistent former students to function effectively with other employees as perceived by their employers.
5. Determine the extent of participation by persistent former students in activities which affect the community and the landscape and nursery industry.
6. Determine when the persistent former students learned the most about each of the selected competencies.
7. Determine the importance of selected competencies as perceived by persistent former students and employers.
8. Determine the ability of persistent former students to perform the selected competencies as perceived by persistent former students and employers.

9. Determine those competencies needed by supervisory or technical level personnel, but not provided to students while they were enrolled in the technical program.

Three hypotheses were stated and tested in this study:

1. Job satisfaction, salary, and job stability are each directly related to persistence in the technical training program and occupational persistence.

2. Significant differences exist in the ratings of persistent former students and their employers regarding the importance of selected competencies needed by persons in supervisory or technician level positions.

3. Significant differences exist in the ratings of the ability of persistent former students to perform selected competencies as rated by the students and their employers.

Methodology

The accessible population consisted of 162 former students who graduated or were scheduled to graduate in 1966, 1967, 1968, 1969, or 1970. These former students were divided into four sub-groups: persistent dropouts, persistent graduates, non-persistent dropouts, and non-persistent graduates. Graduates are defined as former students who completed requirements for graduation from the Landscape and Nursery Technician program. Dropouts are those former students who completed one or more terms in the program, but did not complete requirements for graduation. Former students who were employed in the landscape and nursery industry and former students who were enrolled

in a horticultural or landscape architecture program other than the Landscape and Nursery Technician program were considered persisters. Former students in the military service, but who entered the service from either the status of a student or an employee in the landscape and nursery fields, were also considered to be persisters. Non-persistent former students were those former students not employed in the landscape and nursery industry and former students not enrolled in a horticultural or landscape architecture program. Former students in the military service, but who entered the service from either the status of a student or an employee in an occupation other than in the landscape and nursery field, were also considered to be non-persisters.

Also included in the population were thirty-eight employers of persistent former students, currently working in the landscape and nursery industry. Each of the 162 former students was contacted by telephone. One hundred thirty-three or 82.1 per cent of them, responded to a mailed questionnaire. Thirty or 79 per cent of the employers returned the questionnaire sent to them.

Two survey instruments were prepared, one for the former students and one for the employers. The instrument used to gather responses from former students contained a section on personal data and a section concerning fifty-five selected competencies. A telephone interview schedule

was developed to secure basic information from the 162 former students. This information reduced the amount of data which needed to be requested by mail. The telephone interview also served as a means of personal contact.

The employers' survey instrument contained two sections. In the first section, employers were asked to rate personality traits and the quality and quantity of work produced by former students in their employ. In the second section, the employers were requested to react to the importance of a list of the fifty-five selected competencies, identical to a list of competencies in an instrument mailed to persistent former students.

The data were tabulated and measures of central tendency and percentages were calculated with the use of a desk calculator. The three hypotheses were stated in the null forms and statistically tested using the CDC 3600 computer at Michigan State University. Statistical tests included analysis of variance, Pearson product-moment correlation, and Student's *t*.

Summary of Data

Data from the telephone interview and official records revealed that twenty-five of the former students were considered as persistent dropouts, fifty-nine as persistent graduates, forty-three as non-persistent dropouts, and thirty-five as non-persistent graduates.

Regrouping the population, 52 per cent of the former students were termed persisters and 48 per cent were non-persisters; 58 per cent graduated from the Landscape and Nursery Technician program and 42 per cent withdrew from the program. Nearly three-fourths of the former students participated in placement training. Forty-one per cent continued their education after leaving the program. Thirteen per cent of the former students at the time of this study, were in the military service, 15 per cent were in college, 4.3 per cent were unemployed, and 68 per cent were employed. By use of the chi-square statistic, it was determined that the 133 respondents to the mailed questionnaire were representative of the total population of 162 former students.

Reasons for withdrawing from the program. Former students not continuing their education after withdrawing from the Landscape and Nursery Technician program indicated low grades most frequently as the reason for withdrawal. Those who did continue their education after withdrawal indicated that they planned to transfer to another college as the principal reason for withdrawal.

When asked how the college experience had been most helpful, the persistent graduates indicated most frequently, "obtaining a clear understanding of occupational requirements and opportunities"; persistent dropouts and non-persistent graduates listed "providing the encouragement,

challenge, and sense of success necessary to continue their education"; and non-persistent dropouts indicated the experience of obtaining a clearer understanding of their abilities and goals as most helpful. When asked how the program could have been more helpful to them, the largest percentage of former students in each of the four categories indicated that a wider range of courses should be offered.

Persistent dropouts and graduates liked most the practicality of the program. Non-persistent dropouts liked "specific courses" most, while non-persistent graduates liked "all courses" most.

Former students were asked what they disliked most about the program. The largest group of the persistent dropouts indicated no dissatisfaction with the program. The persistent graduates and the non-persistent graduates offered a wide variety of responses. Both groups of graduates tended to dislike specific courses in the agricultural technology program.

Job and educational histories of former students. Eighty-eight employed former students indicated a mean salary of $8,600. Persistent graduates received the highest mean salary of $9,700. Persistent former students tended to be more satisfied with their present jobs than were the non-persisters. The four groups of former students revealed only minor differences in the mean number of jobs

which they had held. Former students reported a mean of two jobs held since leaving high school. It was hypothesized that no significant differences exist in job satisfaction, job stability, and salary among the four groups of former students. Based upon the statistical analysis, this hypothesis can not be rejected for the factors of job stability and job satisfaction, nor can it be accepted as true for the factor of salary.

Sixteen of the eighteen former students now in the military service were considered persisters. Eleven of these plan to return to the landscape and nursery industry after dicharge. Forty-six per cent or fourteen of the thirty veterans entered the landscape and nursery industry after discharge from the military service.

After graduation from the program, eight of the fifteen persistent former students who continued their education did so for they desired a position in the landscape and nursery industry which required a higher level of education. Five of the fifteen non-persisters who continued their education after graduation did so because they desired to enter a field of work other than the landscape and nursery industry. A desire for a pcsition in industry which required a higher level of education was the reason offered by over 80 per cent of the persistent dropouts for continuing their education after leaving the

Landscape and Nursery Technician program. One-half of the sixteen non-persistent dropouts wanted to learn a different trade or to enter another field of work.

Primarily, graduate persisters did not continue their education after graduation from the program because they felt they had adequate training for work in a particular area or they had secured a full-time position which they perferred to continued education. Fifty per cent of the graduate non-persisters also indicated that they secured a full-time position which they perferred to continued education. Former students who withdrew from the program indicated that the principal reason for not continuing their education was entrance into military service.

Sixty-five per cent of the former students completed more than twenty-five months of education since leaving high school. Non-persistent graduates completed an average of thirty-seven months, while non-persistent dropouts completed an average of nineteen months of education. An average of thirty-one months of education were completed by persistent graduates and an average of twenty-six months of education, since high school, were completed by persistent dropouts. Fifty-four per cent of the former students limited their study since high school, to landscape and nursery related areas. Approximately one-fourth of the former students have attended community

colleges. Four-year colleges were attended by slightly over one-fourth of the former students.

Abilities to function effectively. Employers rated the persistent former students in their employ on twelve personality traits. Persistent graduates rated higher than persistent dropouts on all traits. "Integrity" received the highest mean rating and "leadership" received the lowest mean rating for both graduates and dropouts.

Participation in activities and organizations. Persistent graduates participated in an average of two activities or organizations, while persistent dropouts participated in only one activity or organization.

Importance of selected competencies. Of the fifty-five competencies considered in this study, the following were perceived by persistent former students and/or their employers to be of most importance for the satisfactory performance of the present jobs of the former students. The ten competencies ranked in descending order of importance are:

43. Maintenance of effective working relationships between employer and employee.

44. Organizing and supervising work crews.

49. Maintenance of effective working relationships with fellow workers.

1. Identification and cultural requirements of landscape plants.

48. Understanding and using effective communication skills.

6. Advising customers on desirable varieties of landscape plants and their costs.

10. Pruning landscape plants.

41. Understanding the regulations pertaining to hired labor.

47. Understanding the principles of effective customer relations.

11. Planting and removal of landscape plantings.

When the fifty-five competencies were grouped into eleven subject areas, the area "working with people", was rated most important by both employers and former students.

The second hypothesis stated that no significant differences exist in the importance of selected competencies as rated by persistent former students and their employers. When tested across all twenty-six pairs, significant differences did exist; therefore, the null hypothesis of no difference cannot be accepted. High positive linear relationships were evident in two pairs of employed persisters and their employers, while four pairs exhibited little or no linear relationships as shown by the Pearson r.

Former students rated nearly all of the competencies to be of greater importance for their present jobs in the landscape and nursery industry than their employers did.

When or where persistent former students learned most about selected competencies. On a majority of the fifty-five

competencies considered in this study, persistent former students, now employed, reported that they had learned most about these competencies while on-the-job. On eleven competencies, responses indicate that 50 per cent or more of the former students learned most about the competencies while in the Landscape and Nursery Technician program. The eleven listed in descending order are:

28. Explaining the origin, development, structure, and texture of soil.
2. Identification of diseases, insects, and other pests.
1. Identification and cultural requirements of landscape plants.
29. Explaining soil acidity.
8. Growing and care of sod in the sod producing nursery.
3. Identification of nutrient deficiencies in landscape plants.
30. Explaining the function of soil nutrients.
18. Propagation of landscape plants.
4. Planning disease and insect control programs.
13. Identifying weeds affecting landscape plantings.
19. Identification and cultural requirements of bedding plants, bulbs, and herbaceous perennials.

With the exception of competency 2, all of these competencies were rated by both former students and employers to be of less than considerable importance for the satisfactory performance of the present jobs of the former students.

Competencies needed by supervisory or technician level personnel, but not provided to students while they were enrolled in the technician program. Persistent former students indicated they learned most about only one of the ten competencies perceived to be of greatest importance while they were in the Landscape and Nursery Technician program. Seven of the ten were learned primarily while on-the-job. Former students acquired the remaining two competencies through a combination of learning before enrolling in the program, learning while in the program, and learning while on-the-job.

Ability of persistent former students to perform selected competencies. Persistent former students and employers rated ten competencies as being performed at or near a satisfactory level of ability required for the job. The ten competencies listed in descending order of ability to perform are:

11. Planting and removal of landscape plantings.
10. Pruning landscape plants.
12. Performing tree surgery.
16. Balling and burlapping trees and shrubs.
49. Maintenance of effective working relations with fellow workers.
53. Advising customers on landscape planning problems.
6. Advising customers on desirable varieties of landscape plants and their costs.

43. Maintenance of effective working relations between employer and employee.

17. Shipping and storing landscape plants.

8. Growing and care of sod in the sod producing nursery.

The third hypothesis stated that no significant differences exist between the ratings of persistent former students and their matched employers on the abilities of the persistent former students to perform selected competencies. When tested for significant differences across all pairs, the null hypothesis of no difference can not be accepted. Two pairs of former students and employers received Pearson r correlations indicating high positive linear relationships in their responses, while the correlations for four pairs indicate little or no linear relationships.

Employers compared persistent former students in their employ with other employees in their firm. Former students rated above average when compared to other employees with no formal training and as much as four years more experience in the landscape and nursery industry.

The fifty-five selected competencies were grouped according to eleven subject area categories. Both former students and their employers gave the highest ratings to the abilities of former students to perform competencies in the area of working with people.

Conclusions

Based on the findings of this study, the following conclusions may be drawn:

1. Former students offered low grades and plans to transfer to another college most frequently as the reasons for withdrawal from the Landscape and Nursery Technician program. While the number of withdrawals was rather high, nearly one-half of those who withdrew transferred to another college or participated in other formal educational programs after leaving the program.

2. Generally, former students, who continue their education after leaving the program, do so to qualify for positions in the landscape and nursery industry which require a higher level of training or to prepare to enter a field of work other than the landscape and nursery industry. Nearly two-thirds of the former students completed more than twenty-five months of education since leaving high school. Over 40 per cent of the former students continued their education after leaving the Landscape and Nursery Technician program. Attainment of associate, baccalaureate, or higher degrees are within the abilities of many former students of the Landscape and Nursery Technician program.

3. Graduation from the Landscape and Nursery Technician program does not necessarily result in increases in job satisfaction, job stability, or salary.

4. Approximately one-half of the former students of the Landscape and Nursery Technician program were associated with the landscape and nursery industry at the time of this study. Nearly all of the former students, who were available for employment at the time of this study, were employed. Persistence in the landscape and nursery industry does not necessarily result in increases in job satisfaction, job stability, or salary.

5. The Landscape and Nursery Technician program appears to provide a practical education; however, a wider range of courses would seem to improve the program.

6. Employers tend to rate persistent graduates higher than persistent dropouts on twelve personality traits. Persistent graduates also exhibit greater social and civic responsibilities when compared to persistent dropouts.

7. Both former students and their employers agree that competencies in the areas of human relations are the most important for successful employment in the landscape and nursery industry. In general, former students perceive the competencies considered in this study to be more important for their jobs than their employers do.

8. Persistent former students, now employed, perceived that they learned most about a majority of the competencies, considered necessary for their employment, in situations other than in the Landscape and Nursery Technician program.

9. Self-assessment by former students and ratings by employers indicate that former students are most capable of performing competencies related to the areas of working with people and customer relations, while they seem to be lacking in abilities related to soil science. However, both former students and their employers did not consider competencies in soil science very important for employment. Employers reported that persistent former students perform their duties and assignments in the landscape and nursery businesses at a higher level than other employees with no formal training and with as much as four years more experience than the former students have had in the landscape and nursery industry.

Implications Of The Study

These implications are based not only on the findings of this study, but also on certain concepts currently held by the writer. The development of these concepts may have been influenced by educational philosophies held by the writer, as well as experiences gained while serving as a graduate assistant in the Institute of Agricultural Technology, Michigan State University.

1. It appears that students enrolled in the Landscape and Nursery Technician program might benefit from more extensive counseling and guidance. Of the 162 former students included in this study, sixty-eight withdrew from the program before graduation. While twenty-five of these sixty-eight dropouts were employed in the landscape and nursery industry, the remaining forty-three were enrolled in other educational programs, employed in work not related to the landscape and nursery industry, or unemployed. In addition, thirty-five of the ninety-four graduates of the program are not associated with the landscape and nursery industry.

It must be recognized, of course, that it is not unusual for students to change their educational and occupational goals. Undoubtedly, much effective counseling and guidance is being provided when students make these vocational decisions. However, it may be appropriate to make an assessment of the current practices to determine if adequate counseling and guidance is being provided to students prior to the time they enroll in the Landscape and Nursery Technician program, as well as when they change their educational and occupational goals. Findings of this study also indicate that instructors should be encouraged to provide more supervision and guidance for their students while they are enrolled in their courses.

2. It would seem appropriate to examine the priorities placed on the competencies to be developed while students are enrolled in the Landscape and Nursery Technician program. Both former students and their employers indicated that competencies related to soils seemed to be the least important for successful employment in the landscape and nursery industry. On the other hand, competencies in the area of human relations were perceived to be the most important. It appears from the data in this study that a majority of the students were not developing these competencies adequately while enrolled in the program. Possibly, an effort should be made to assess current aspects of the program which are designed to develop effective competencies in human relations.

3. Graduates included in this study spent one-third of their time, or two six-month periods, in the placement training phase of the Landscape and Nursery Technician program. Recently, the placement training phase has been reduced to one six-month period. In this study no respondent indicated that the two, six-month periods in placement training were too long. Rather, the former students indicated that more supervision and guidance could have been offered while they were on placement training. Actually, restrictions placed on the program coordinator makes it impossible for him to visit students

who are placed near their homes in other states. The amount of time, which the coordinator is able to spend with students placed in Michigan, is limited. Methods should be explored for providing more adequate coordination services to students while they are on occupational placement.

The intent of a placement training program would appear to be the development of competencies needed in the landscape and nursery industry. If this is true, it would seem that more former students now employed in the industry, would have indicated that they learned most about some of the competencies while participating in placement training. Restrictions on the coordinator, which makes it impossible to provide adequate supervision for students on placement training, and the need for developing competencies to a greater extent while on placement training suggest that it might be appropriate to confine placements to cooperators who would provide careful supervision and offer adequate learning opportunities in all facets of their businesses.

4. Former students were perceived by their employers to be deficient in leadership ability. This deficiency was also reflected in their lack of participation in activities and organizations, although graduates had participated more often than dropouts. Very few former students had

served as officers. An intensified program of leadership development, to encourage students to participate as active members of industrial, civic, and social organizations, should be considered.

Recommendations for Further Study

1. Former students and their employers did not agree on the importance of competencies required for the former students to satisfactorily perform their present jobs in the landscape and nursery industry. A study should be undertaken to determine the reasons for this difference.

2. Former students and employers indicated that a majority of the fifty-five competencies considered in this study were not required or were only slightly important for employment in the landscape and nursery industry. Further study should be made to determine why the former students and their employers gave such a low rating of importance to so many of the fifty-five competencies included in this study. An effort should also be made to determine if other competencies, not considered in this study are sufficiently important to be developed in the Landscape and Nursery Technician program.

3. Former students offered a variety of free responses when questioned concerning what they liked most

or disliked about the Landscape and Nursery Technician program. An in-depth study of their suggestions for changes should permit former students to make a significant input toward improvement of the Landscape and Nursery Technician program.

4. Competencies suggesting managerial responsibilities tended to be rated lower in importance by employers in the landscape and nursery industry than competencies indicating manipulative abilities. Further study is needed to determine to what extent employers expect former students of the Landscape and Nursery Technician program to be trained in managerial competencies and in manipulative competencies.

5. Evaluation is a continuous process. This study should be the beginning of a continuing follow-up of all former students and their employers at regular intervals.

6. Cost-effectiveness has gradually received increased attention in the evaluation of vocational and technical education. This approach may be an appropriate technique for evaluating technical education because it allows non-economic benefits to be related to the cost of the programs. A cost-effectiveness study should prove beneficial for the continual evaluation of the Landscape and Nursery Technician program.

7. Nearly one-half of the former students who had been enrolled in the Landscape and Nursery Technician program were no longer associated with landscape and nursery work at the time of this study. Included in this group were over one-third of the ninety-four graduates of the program. Research into the reasons for this attrition should be conducted.

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APPENDICES

APPENDIX A

APPENDIX A

PROGRAM OBJECTIVES

Landscape and Nursery Technician Program
Institute of Agricultural Technology
Michigan State University

Introduction:

This set of program objectives has been developed specifically for the Landscape and Nursery Technician program. It is recognized that there will be different approaches in the realization of the objectives, depending upon the characteristics of the individuals enrolled and the types of problems being dealt within the educational program. Development of the more specific instructional objectives for each course included in the program is the responsibility of the instructor.

Educational objectives are not static. Changes will have to be made as the needs of the individuals and industry change. Each person involved with this program should share the responsibility of being constantly alert to the changes in needs and adjust the objectives to meet those needs.

OBJECTIVES

The objectives of the Landscape and Nursery Technician program are:

I. TO DEVELOP COMPETENCIES NEEDED BY INDIVIDUALS ENGAGED IN OR PREPARING TO ENGAGE IN SUPERVISORY OR TECHNICIAN POSITIONS IN THE LANDSCAPE AND NURSERY INDUSTRY.

Contributory Objectives

Each individual should:

A. Understand and apply the principles of soil science, horticultural plant science, landscape design, management, and mechanization as they relate to the landscape and nursery industry.

B. Perform the managerial and operative activities necessary to enter at the supervisory or technician level and progress in the landscape and nursery by:

   1. Understanding the processing and marketing of nursery products.

APPENDIX A

2. Comprehending the principles of selling nursery products and supplies and providing services to meet the specific needs of the consumer;

3. Understanding how landscape and nursery businesses are operated and financed;

4. Understanding employee-employer relations;

5. Comprehending the principles involved in maintaining effective customer relation;

6. Preparing, maintaining, interpreting and using records and reports;

7. Understanding, interpreting, and following memorandums, manuals, written policies, and regulations which pertain to the landscape and nursery industry.

II. TO DEVELOP AN UNDERSTANDING OF THE LANDSCAPE AND NURSERY SO THE INDIVIDUAL CAN MAKE A DECISION AS TO HIS PLACE IN THE INDUSTRY.

Contributory Objectives

Each individual should:

A. Understand the importance of the landscape and nursery industry to the Nation's ecomony and its impact upon the daily lives of all citizens;

B. Determine the types and numbers of occupational opportunities in the landscape and nursery industry.

C. Determine the preparation needed to enter and progress in the industry;

D. Participate in the work experience program;

E. Evaluate information concerning landscape and nursery occupations in relation to personal characteristics, appitudes, and interests;

F. Make a commitment based on study and experience as to his place in the landscape and nursery industry.

APPENDIX A

III. TO SECURE SATISFACTORY EMPLOYMENT AND TO ADVANCE IN THE LANDSCAPE AND NURSERY INDUSTRY THROUGH A PROGRAM OF CONTINUING EDUCATION.

Contributory Objectives

Each individual should:

A. Analyze opportunities for self-employment;

B. Analyze job opportunities and requirements, and assess personal abilities and interests in terms of these requirements;

C. Apply for employment and participate in employment interviews in order to secure satisfactory employment in the industry;

D. Plan and pursue a program of continuing education.

IV. TO DEVELOP THOSE ABILITIES IN HUMAN RELATIONS WHICH ARE ESSENTIAL FOR SATISFACTORY PERFORMANCE IN THE LANDSCAPE AND NURSERY INDUSTRY.

Contributory Objectives

Each individual should:

A. Value the dignity of work and have pride in the work accomplished;

B. Establish and maintain effective and ethical working relationships with associates;

C. Develop the ability to communicate effectively;

D. Develop acceptable personal and work habits.

APPENDIX A

V. TO DEVELOP THE ABILITIES NEEDED TO EXERCISE AND FOLLOW EFFECTIVE LEADERSHIP IN FULFILLING OCCUPATIONAL, SOCIAL, AND CIVIC RESPONSIBILITIES.

Contributory Objectives

Each individual should:

A. Associate with and become a functioning member of industry related organizations;

B. Cooperate for the common good in civic and community activities;

C. Participate in the development of local, state, national and international programs affecting the landscape and nursery industry.

APPENDIX B

APPENDIX B

LANDSCAPE AND NURSERY TECHNICIAN PROGRAM
FORMER STUDENT
FOLLOW-UP SURVEY FORM

Name_____

Address_____
(Street)

_____
(City) (State) (Zip)

SECTION I

This section is designed to expand the information which you gave during the recent telephone interview.

1. Since you did not continue your education after graduating from the Landscape and Nursery Technician program, please indicate by a check(✓) which one of the responses listed below most accurately describes your reason for not continuing your education.

____1.1. You felt you had an adequate education for work in a particular area.
____1.2. You were unable to transfer to another college because your grade point average was not high enough.
____1.3. You could not afford to continue.
____1.4. You felt that additional higher education had little to offer.
____1.5. You secured a full time position which you perferred to continued education.
____1.6. You married.
____1.7. You entered the military.
____1.8. Other (explain)_____

_____

2.
3.
4.
5.
6.
7.
8.

LANDSCAPE AND NURSERY TECHNICIAN PROGRAM
FORMER STUDENT
FOLLOW-UP SURVEY FORM

Name_____

Address_____
(Street)

_____
(City) (State) (Zip)

SECTION I

This section is designed to expand the information which you gave during the recent telephone interview.

1.
2. Since you continued your education after receiving a certificate from the Landscape and Nursery Technician program, please indicate by a check(✓) which one of the responses listed below most accurately describes your reason for continuing your education.

____2.1. You desired a position in the landscape and nursery industry which required a higher level of education than provided by the Landscape and Nursery Technician program.(e.g. landscape architect)
____2.2. You wished to learn a different skill or trade.
____2.3. You were strongly encouraged by parents and/or friends to continue in another college or program.
____2.4. You desired to enter a field of work other than the landscape and nursery industry which required a higher level of education.
____2.5. You were not sure of what you wanted to do after graduating from the Landscape and Nursery Technician program.
____2.6. Other (explain)_____

_____

3.
4.
5.
6.
7.
8.

LANDSCAPE AND NURSERY TECHNICIAN PROGRAM
FORMER STUDENT
FOLLOW-UP SURVEY FORM

Name_____

Address_____
(Street)

_____
(City) (State) (Zip)

SECTION I

This section is designed to expand the information which you gave during the recent telephone interview.

1.
2.
3. Check(✓) the one response which most accurately describes your reason for withdrawing from the Landscape and Nursery Technician program.

____3.1. You lost interest in further education.
____3.2. You were asked to withdraw because of low grades.
____3.3. You had personal problems.
____3.4. You obtained full-time employment.
____3.5. You felt the training you desired had been completed.
____3.6. You developed an interest in a field other than the landscape and nursery industry.
____3.7. You had inadequate financial support.
____3.8. You entered the military.
____3.9. You developed a serious illness.
____3.10. You married.
____3.11. You planned to transfer to another college.
____3.12. Other (explain)_____

4. Since you continued your education after withdrawing from the Landscape and Nursery Technician program, check(✓) the one response which most accurately describes your reason for continuing your education.

____4.1. You desired a position in the landscape and nursery industry which required a higher level of education than provided by the Landscape and Nursery Technician program. (e.g. landscape architect)
____4.2. You wished to learn a different skill or trade.
____4.3. You were strongly encouraged by parents and/or friends to continue in another college or program.
____4.4. You desired to enter a field of work other than in the landscape and nursery industry which required a higher level of education.
____4.5. You were not sure of what you wanted to do after leaving the Landscape and Nursery Technician program.
____4.6. Other (explain)_____

5.
6.
7.
8.

LANDSCAPE AND NURSERY TECHNICIAN PROGRAM
FORMER STUDENT
FOLLOW-UP SURVEY FORM

Name_____

Address_____
(Street)

_____
(City) (State) (Zip)

SECTION I

This section is designed to expand the information which you gave during the recent telephone interview.

1.
2.
3.
4.
5. Check(✓) the one response which most accurately describes your reason for withdrawing from the Landscape and Nursery Technician program.

____5.1. You lost interest in further education.
____5.2. You were asked to withdraw because of low grades.
____5.3. You had personal problems.
____5.4. You obtained full-time employment.
____5.5. You felt the training you desired had been completed.
____5.6. You developed an interest in a field other than the landscape and nursery industry.
____5.7. You had inadequate financial support.
____5.8. You entered the military.
____5.9. You developed a serious illness.
____5.10. You married.
____5.11. You planned to transfer to another college.
____5.12. Other (explain)_____

6. Since you did not continue your education after withdrawing from the Landscape and Nursery Technician program, check(✓) the one response which most accurately describes your reason for not continuing your education.

____6.1. You felt you had an adequate education for work in a particular area.
____6.2. You were unable to transfer to another college because your grade point average was not high enough.
____6.3. You could not afford to continue.
____6.4. You felt that additional education had little to offer.
____6.5. You secured a full-time position which you perferred to continued education.
____6.6. You married.
____6.7. You entered the military.
____6.8. Other (explain)_____

7.
8.

SECTION I (continued)

You indicated by telephone that you are either in the military at the present time or are a veteran. To expand on these categories, answer the following questions.

7. Before entering the military service, I was: Check (√) one

_____7.1. A student studying for a position in the landscape and nursery industry.
_____7.2. A student studying for a position not related to the landscape and nursery industry.
_____7.3. Employed in a position related to the landscape and nursery industry.
_____7.4. Employed in a job not related to the landscape and nursery industry.
_____7.5. Self-employed in the landscape and nursery industry.
_____7.6. Self-employed in an occupation not related to the landscape and nursery industry.
_____7.7. Unemployed, but looking for a job.
_____7.8. Unemployed, not looking for a job.

8. After discharge, I did or will: Check (√) one

_____8.1. Enroll in an educational institution for study related to the landscape and nursery industry.
Name of institution_____
_____8.2. Take a job in the landscape and nursery industry.
_____8.3. Become self-employed in the landscape and nursery industry.
_____8.4. Enroll in an educational institution for study not related to the landscape and nursery industry.
Area of study_____
_____8.5. Take a job which is not related to the landscape and nursery industry.
Occupational area_____
_____8.6. Become self-employed in an occupation not related to the landscape and nursery industry.
Occupational area_____
_____8.7. Not look for work (unemployed by choice)

SECTION II

This section is designed to obtain general information concerning your experiences while in the Landscape and Nursery Technician program and some of your activities since leaving the program.

1. Indicate how your college experience in the Landscape and Nursery Technician program was most helpful in preparing you for a career. Check(✓) one area which was of most assistance.

____1.1. You obtained a clearer understanding of your abilities and goals.
____1.2. You obtained a clearer understanding of occupational requirements and opportunities.
____1.3. You received the training necessary to get a job in the field of your choice.
____1.4. You received the encouragement, challenge, and sense of success necessary for you to continue your education beyond the level provided by the Technician program.
____1.5. Through a particular course or group of courses, you discovered a new field of interest.
____1.6. You learned how to get along with people.
____1.7. Other (explain)_____

_____

2. What did you like most about the Landscape and Nursery Technician program?

_____

_____

_____

_____

_____

_____

3. Indicate how your college experience in the Landscape and Nursery Technician program could have been more helpful to you in preparing for a career. Check(✓) one area which would have been the most help to you.

____3.1. A closer relationship could exist between students and instructors.
____3.2. A wider range of courses could be offered.
____3.3. More supervision and guidance in classwork could be offered.
____3.4. More supervision and guidance while on placement training could be offered.
____3.5. There could be more helpful guidance in choice and explanation of courses.
____3.6. There could be more student activities.
____3.7. Other (explain)_____

_____

4. What did you dislike most about the Landscape and Nursery Technician program?

_____

_____

_____

_____

_____

_____

5. Indicate which of the following activities or organizations you have participated in since leaving the Landscape and Nursery Technician program. If you participated in the activity or organization, indicate by a check(✓) in the spaces before numbers 1 to 17. Check(✓) in the spaces before 11 to 171, if you held an office. Check all that apply.

____.1. Civic clubs (Kiwanis, Lions, etc.)	____.11.
____.2. Fraternal organizations	____.21.
____.3. Political party organizations	____.31.
____.4. Local landscape and nursery organizations	____.41.
____.5. State landscape and nursery organizations	____.51.
____.6. National landscape and nursery organizations	____.61.
____.7. Other industry organizations (not related to landscape and nursery industry)	____.71.
____.8. Labor unions	____.81.
____.9. Agricultural organizations	____.91.
____.10. Schools: parent organizations, etc.	____.101.
____.11. Schools: Board of Education, etc.	____.111.
____.12. Social clubs (Square Dance, etc.)	____.121.
____.13. Civic committees (local government)	____.131.
____.14. Veteran organizations	____.141.
____.15. Garden clubs	____.151.
____.16. Other (explain)_____	____.161.
____.17. Other (explain)_____	____.171.

6. If employed, what is your present salary on a yearly basis? Include commissions, bonuses, etc.) Check one.

____6.1. Less than $3,500	____6.5. $ 9,500 - $11,499
____6.2. $3,500 - $5,499	____6.6. 11,500 - 13,499
____6.3. 5,500 - 7,499	____6.7. 13,500 - 15,499
____6.4. 7,500 - 9,499	____6.8. 15,500 and over

7. If employed, indicate your satisfaction with your present position. Check one.

____7.1. Very satisfied.
____7.2. Satisfied
____7.3. Dissatisfied
____7.4. Very dissatisfied

8. Indicate your employment history since high school. Begin with present or most recent job first. Include all jobs in which you spent more than 20 hours per week and were employed for more than two months.

	Present or Last Job	Previous Job
8.1. Dates of Employment	_____to_____	_____to_____
8.2. Name and Address of Employer	_____ _____ _____ _____	_____ _____ _____ _____
8.3. Salary	.31.starting $_____ .32.ending $_____	.31.starting $_____ .32.ending $_____
8.4. Give Job Title and Describe Duties	Title_____ Duties_____ _____ _____ _____	Title_____ Duties_____ _____ _____ _____
8.5. Reasons for Leaving	(Check all that apply)	(Check all that apply)
.51.could not get along with employer	.51._____	.51._____
.52.could not get along with fellow workers	.52._____	.52._____
.53.poor wages	.53._____	.53._____
.54.did not like the work	.54._____	.54._____
.55.advanced to better job	.55._____	.55._____
.56.seasonal job	.56._____	.56._____
.57.required more training than I had	.57._____	.57._____
.58.military	.58._____	.58._____
.59.school	.59._____	.59._____
.510.other	.510.____(explain)_____	.510.____(explain)_____

8. Employment history continued.

	Previous Job	Previous Job
8.1. Dates of Employment	_____ to _____	_____ to _____
8.2. Name and Address of Employer	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____
8.3. Salary	.31. starting $_____ .32. ending $_____	.31. starting $_____ .32. ending $_____
8.4. Give Job Title and Describe Duties	Title_____ Duties_____ _____ _____ _____	Title_____ Duties_____ _____ _____ _____
8.5. Reasons for Leaving	(Check all that apply)	(Check all that apply)
.51. could not get along with employer	.51._____	.51._____
.52. could not get along with fellow workers	.52._____	.52._____
.53. poor wages	.53._____	.53._____
.54. did not like the work	.54._____	.54._____
.55. advanced to better job	.55._____	.55._____
.56. seasonal job	.56._____	.56._____
.57. required more training than I had	.57._____	.57._____
.58. military	.58._____	.58._____
.59. school	.59._____	.59._____
.510. other	.510.____(explain)_____	.510.____(explain)_____

(If this is not sufficient space to complete list, use back of this page. Use same format.)

9. How much formal education have you received since leaving high school? Include all work in colleges, adult classes, workshops, short courses, company schools, etc. List most recent education first.

9.1. Dates of Enrollment (mo./yr.)	9.2. Name and Address of Institution or Sponsor	9.3. Main Area of Study	9.4 Degree or Certificate
A. _____ to _____			
B. _____ to _____			
C. _____ to _____			
D. _____ to _____			
E. _____ to _____			
F. _____ to _____			

(If this is not sufficient space to complete list, use back of this page. Use same format.)

SECTION III - SKILLS FOR THE LANDSCAPE AND NURSERY INDUSTRY

This section of the questionnaire is designed to determine three factors:

1. the importance of the skill in your present job,
2. when you learned the most about the skill,
3. a self-rating as to your ability to perform the skill.

Directions: For each skill listed, answer the following three questions:

1. How important is this skill for your present job?
   Indicate the importance of the skill by placing a check(✓) in the appropriate column.

   Column 0: NOT REQUIRED to satisfactorily perform my job.

   Note: If skill is NOT REQUIRED, disregard remainder of ratings for that skill and move on to next skill.

   1: SLIGHTLY IMPORTANT
   2: CONSIDERABLE IMPORTANCE
   3: CRITICAL IMPORTANCE

2. Where did you learn most about this skill?
   Indicate where you learned most about the skill by placing a check(✓) in the appropriate column.

   Column 1: NO TRAINING: no formal instruction in skill.
   2: BEFORE ENROLLING: you could perform the skill before enrolling in the Landscape and Nursery Technician program.
   3: AG TECH COURSES: you learned most about the skill in Landscape and Nursery Technician program courses.
   4: PLACEMENT TRAINING: you learned most about the skill while on placement training.
   5: ON-THE-JOB: you learned most about the skill after taking a full time job since leaving the Landscape and Nursery Technician program.
   6: SPECIAL SCHOOLS: Includes formal classes such as adult classes, workshops, shortcourses, company schools, other colleges, etc. which you took after leaving the Landscape and Nursery Technician program.

3. How would you evaluate your ability to perform this skill?
   Indicate by placing a check(✓) in the appropriate column, your ability to perform the skill.

   Column 1: LITTLE OR NO ABILITY to perform the skill.
   2: Ability NEEDS IMPROVEMENT to properly do job.
   3: Ability generally SATISFACTORY for present job.
   4: OUTSTANDING ABILITY to perform skill.

	1. Importance of this skill for your present job.				2. Where did you learn most about this skill?						3. Evaluate your ability to perform this skill.			
	NOT REQUIRED	SLIGHTLY IMPORTANT	CONSIDERABLE IMPORTANCE	CRITICAL IMPORTANCE	NO TRAINING	BEFORE ENROLLING	AG TECH COURSES	PLACEMENT TRAINING	ON-THE-JOB, AFTER AG TECH	SPECIAL SCHOOLS	LITTLE OR NO ABILITY	NEEDS IMPROVEMENT	SATISFACTORY	OUTSTANDING ABILITY
	0	1	2	3	1	2	3	4	5	6	1	2	3	4
EXAMPLE RESPONSES														
1. Identification & cultural requirements of landscape plants. (As checked, this would indicate that the skill has considerable importance to your job; you learned most about it while on placement training; and you have an ability satisfactory to properly perform your job.)			✓					✓					✓	
2. Identification of diseases, insects, and other pests. (As checked, this would indicate that the skill is not required to satisfactorily perform your job.)	✓													
COMPETENCIES AND SKILLS														
1. Identification & cultural requirements of landscape plants.														
2. Identification of diseases, insects, and other pests.														
3. Identification of nutrient deficiencies in landscape plants.														
4. Planning disease and insect control programs.														
5. Planning programs for supplying nutrient needs for landscape plants.														
6. Advising customers on desirable varieties of landscape plants and their costs.														
7. Selling horticultural plants and supplies.														

If skill is NOT REQUIRED, disregard remainder of ratings for that skill and move on to next skill.

COMPETENCIES AND SKILLS	1. Importance of this skill for your present job.				2. Where did you learn most about this skill?						3. Evaluate your ability to perform this skill.			
	NOT REQUIRED	SLIGHTLY IMPORTANT	CONSIDERABLE IMPORTANCE	CRITICAL IMPORTANCE	NO TRAINING	BEFORE ENROLLING	AG TECH COURSES	PLACEMENT TRAINING	ON-THE-JOB, AFTER AG TECH	SPECIAL SCHOOLS	LITTLE OR NO ABILITY	NEEDS IMPROVEMENT	SATISFACTORY	OUTSTANDING ABILITY
	0	1	2	3	1	2	3	4	5	6	1	2	3	4
8. Growing and care of sod in the sod producing nursery.														
9. Establishing, caring for, and restoring lawns.														
10. Pruning landscape plants.														
11. Planting and removal of landscape plantings.														
12. Performing tree surgery														
13. Identifying weeds affecting the landscape plantings.														
14. Planning programs for weed control -- chemical and cultural.														
15. Maintaining, adjusting, repairing, and caring for mechanical equip..														
16. Balling and burlapping trees and shrubs.														
17. Shipping and storing landscape plants.														
18. Propagation of landscape plants.														
19. Identification & cultural requirements of bedding plants, bulbs, and herbaceous perennials.														
20. Identifying agricultural chemicals --their function, use, and toxic effects for landscape plants.														
21. Determining proper rates, mixing, applying, and safe handling of chemicals.														
22. Planning a purchasing program for securing agricultural chemicals.														
23. Performing field experiments to develop methods of using agricultural chemicals.														
24. Adjusting and maintaining application equipment.														
25. Operating power driven application equipment.														

If skill is NOT REQUIRED, disregard remainder of ratings for that skill and move on to next skill.

COMPETENCIES AND SKILLS	1. Importance of this skill for your present job.				2. Where did you learn most about this skill?						3. Evaluate your ability to perform this skill.			
	NOT REQUIRED	SLIGHTLY IMPORTANT	CONSIDERABLE IMPORTANCE	CRITICAL IMPORTANCE	NO TRAINING	BEFORE ENROLLING	AG TECH COURSES	PLACEMENT TRAINING	ON-THE-JOB,AFTER AG TECH	SPECIAL SCHOOLS	LITTLE OR NO ABILITY	NEEDS IMPROVEMENT	SATISFACTORY	OUTSTANDING ABILITY
	0	1	2	3	1	2	3	4	5	6	1	2	3	4
26. Operating hand operated application equipment.														
27. Understanding environmental and human hazards associated with agricultural chemicals.														
28. Explaining the origin, development structure, and texture of soils.														
29. Explaining soil acidity.														
30. Explaining the function of soil nutrients.														
31. Taking and testing soil samples and interpreting soil tests.														
32. Making fertilizer recommendations on the basis of soil test results.														
33. Planning proper use and application of organic and mineral fertilizers.														
34. Planning and determining cost of soil fertility build-up program.														
35. Planning and determining cost of maintaining a balanced soil fertility program.														
36. Planning a program of soil erosion control.														
37. Determining need for and planning drainage systems.														
38. Determining need for and planning irrigation systems.														
39. Understanding the use of financial records in the business.														
40. Understanding the proper use of inventory and rotation records.														
41. Understanding the regulations pertaining to hired labor.														
42. Understanding the regulations pertaining to nursery stock.														

If skill is NOT REQUIRED, disregard remainder of ratings for that skill and move on to next skill.

COMPETENCIES AND SKILLS	1. Importance of this skill for your present job.				2. Where did you learn most about this skill?						3. Evaluate your ability to perform this skill.			
	NOT REQUIRED	SLIGHTLY IMPORTANT	CONSIDERABLE IMPORTANCE	CRITICAL IMPORTANCE	NO TRAINING	BEFORE ENROLLING	AG TECH COURSES	PLACEMENT TRAINING	ON-THE-JOB AFTER AG TECH	SPECIAL SCHOOLS	LITTLE OR NO ABILITY	NEEDS IMPROVEMENT	SATISFACTORY	OUTSTANDING ABILITY
	0	1	2	3	1	2	3	4	5	6	1	2	3	4
43. Maintenance of effective working relationships between employer and employee.														
44. Organizing and supervising work crew.														
45. Understanding basic business accounting.														
46. Understanding and using proper techniques of selling.														
47. Understanding the principles of effective customer relations.														
48. Understanding and using effective communication skills.														
49. Maintenance of effective working relationships with fellow workers.														
50. Planning a landscape design.														
51. Proper use of lettering and rendering techniques in designs.														
52. Estimating time and cost for landscaping contract jobs.														
53. Advising customers on landscape planning problems.														
54. Selling landscape designs.														
55. Interpretation of plans, specifications, and contracts.														
Are there others which should be included?														

APPENDIX C

APPENDIX C

LANDSCAPE AND NURSERY TECHNICIAN PROGRAM
EMPLOYER SURVEY FORM

Name_____

Address_____
(street)

_____
(city) (state) (zip)

Name of person completing this form:_____

Title or position in firm:_____

The responses given on this form should apply only to,_____, a former student in the Landscape and Nursery Technician program, Institute of Agricultural Technology, Michigan State University.

SECTION I

This section is designed to determine certain individual traits and the work capacity of the above named individual.

1. Traits of the individual.
Respond to the following set of positive statements of individual traits by placing a check(✓) along the scale indicating your degree of agreement with each statement.

	Strongly Agree						Strongly Disagree
.1. He is trustworthy, honest, and loyal.							
.2. He is prompt and reliable.							
.3. He is willing to accept and perform work.							
.4. He has the ability to plan and direct his own work.							
.5. He has the ability to make sound decisions,							
.6. He has the ability to work with others in harmony.							
.7. He understands people and can direct the work of others.							
.8. He is enthusiastic in the performance of his work.							
.9. He has poise and self-control.							
.10. He is considerate of and kind to others.							
.11. He is neat, clean, and dresses appropriately.							
.12. He meets and applies himself to new situations.							

2. Compare the employee in question with other employees in your firm on quality and quantity of work produced. Place a check (✓) along the rating line to indicate the rating of the above named employee.

.1. Compared to a person with no formal training and no experience in the industry, he would be rated:
(If there is no one with which to compare, check here./ /)

	Superior						Inferior
.11. Quality of work	'	'	'	'	'	'	'
.12. Quantity of work	'	'	'	'	'	'	'

.2. Compared to a person with no formal training and the same number of years of experience in the industry, he would be rated:
(If there is no one with which to compare, check here./ /)

	Superior						Inferior
.21. Quality of work	'	'	'	'	'	'	'
.22. Quantity of work	'	'	'	'	'	'	'

.3. Compared to a person with no formal training and two years more experience in the industry, he would be rated:
(If there is no one with which to compare, check here./ /)

	Superior						Inferior
.31. Quality of work	'	'	'	'	'	'	'
.32. Quantity of work	'	'	'	'	'	'	'

.4. Compared to a person with no formal training and four years more experience in the industry, he would be rated:
(If there is no one with wich to compare, check here./ /)

	Superior						Inferior
.41. Quality of work	'	'	'	'	'	'	'
.42. Quantity of work	'	'	'	'	'	'	'

SECTION II - SKILLS FOR THE LANDSCAPE AND NURSERY INDUSTRY

This section is designed to determine two factors:
1. the importance of the skill for the position held by the above employee,
2. a rating of the ability of the employee to perform the skill.

Directions: For each skill, answer the following two questions:

1. How important is this skill to the employee's present job?

   Indicate the importance of the skill by placing a check(✓) in the appropriate column.

   Column 0: NOT REQUIRED to satisfactorily perform his job.

   Note: If skill is NOT REQUIRED, disregard remainder of ratings for that skill and move on to next skill.

   1: SLIGHTLY IMPORTANT
   2: CONSIDERABLE IMPORTANCE
   3: Of CRITICAL IMPORTANCE

2. How would you evaluate his ability to perform the skill?

   Indicate his ability to perform the skill by placing a check(✓) in the appropriate column.

   Column 1: LITTLE OR NO ABILITY to perform the skill.
   2: Ability NEEDS IMPROVEMENT to properly do job.
   3: Ability generally SATISFACTORY for present job.
   4: OUTSTANDING ABILITY to perform skill.

SEE EXAMPLE RESPONSES ON NEXT PAGE

	1. Importance of this skill for his present job.				2. Evaluate his ability to perform this skill.			
	NOT REQUIRED	SLIGHTLY IMPORTANT	CONSIDERABLE IMPORTANCE	CRITICAL IMPORTANCE	LITTLE OR NO ABILITY	NEEDS IMPROVEMENT	SATISFACTORY	OUTSTANDING ABILITY
	0	1	2	3	1	2	3	4
EXAMPLE RESPONSES								
1. Identification & cultural requirements of landscape plants. (As checked, this would indicate that the skill has considerable importance to his job and he has an ability satisfactory to properly perform his job.			✓				✓	
2. Identification of diseases, insects, and other pests. (As checked, this would indicate that the skill is not required to satisfactorily perform his job.	✓							
COMPETENCIES AND SKILLS								
1. Identification & cultural requirements of landscape plants.								
2. Identification of diseases, insects, & other pests.								
3. Identification of nutrient deficiencies in landscape plants.								
4. Planning disease and insect control programs.								
5. Planning programs for supplying nutrient needs for landscape plants.								
6. Advising customers on desirable varieties of landscape plants and their costs.								
7. Selling horticultural plants and supplies.								
8. Growing and care of sod in a sod producing nursery.								
9. Establishing, caring for, and restoring lawns.								
10. Pruning landscape plants.								
11. Planting and removal of landscape plants.								
12. Performing tree surgery.								
13. Identifying weeds affecting landscape plantings.								
14. Planning programs for weed control -- chemical and cultural..								
15. Maintaining, adjusting, repairing, and caring for mechanical equipment.								
16. Balling and burlapping trees and shrubs.								

If skill is NOT REQUIRED, disregard remainder of ratings for that skill and move on to next skill.

COMPETENCIES AND SKILLS	1. Importance of this skill for his present job.				2. Evaluate his ability to perform this skill.			
	NOT REQUIRED	SLIGHTLY IMPORTANT	CONSIDERABLE IMPORTANCE	CRITICAL IMPORTANCE	LITTLE OR NO ABILITY	NEEDS IMPROVEMENT	SATISFACTORY	OUTSTANDING ABILITY
	0	1	2	3	1	2	3	4
17. Shipping and storing landscape plants.								
18. Propagation of landscape plants.								
19. Identification & cultural requirements of bedding plants, bulbs, and herbaceous perennials.								
20. Identifying agricultural chemicals - their function, use, and toxic effects for landscape plants.								
21. Determining proper rates, mixing, applying, and safe handling of chemicals.								
22. Planning a purchasing program for securing agricultural chemicals.								
23. Performing field experiments to develop methods of using agricultural chemicals.								
24. Adjusting and maintaining application equipment.								
25. Operating power driven application equipment.								
26. Operating hand operated application equipment.								
27. Understanding environmental and human hazards associated with agricultural chemicals.								
28. Explaining the origin, development, structure, and texture of soils.								
29. Explaining soil acidity.								
30. Explaining the function of soil nutrients.								
31. Taking and testing soil samples and interpreting soil tests.								
32. Making fertilizer recommendations on the basis of soil tests.								
33. Planning proper use and application of organic and mineral fertilizers.								
34. Planning and determining cost of soil fertility build-up program.								
35. Planning and determining cost of maintaining a balanced soil fertility program.								
36. Planning a program of soil erosion control.								
37. Determining need for and planning drainage systems.								
38. Determining need for and planning irrigation systems.								
39. Understanding the use of financial records in the business.								

If skill is NOT REQUIRED, disregard remainder of ratings for that skill and move on to next skill.

COMPETENCIES AND SKILLS	1. Importance of this skill for his present job.				2. Evaluate his ability to perform this skill.			
	NOT REQUIRED	SLIGHTLY IMPORTANT	CONSIDERABLE IMPORTANCE	CRITICAL IMPORTANCE	LITTLE OR NO ABILITY	NEEDS IMPROVEMENT	SATISFACTORY	OUTSTANDING ABILITY
	0	1	2	3	1	2	3	4
40. Understanding the proper use of inventory and rotation records.								
41. Understanding the regulations pertaining to hired labor.								
42. Understanding the regulations pertaining to nursery stock.								
43. Maintenance of effective working relationships between employer and employee.								
44. Organizing and supervising work crew.								
45. Understanding basic business accounting.								
46. Understanding and using proper techniques of selling.								
47. Understanding the principles of effective customer relations.								
48. Understanding and using effective communication skills								
49. Maintenance of effective working relationships with fellow workers.								
50. Planning a landscape design.								
51. Proper use of lettering and rendering techniques in designs.								
52. Estimating time and cost for landscaping contract jobs								
53. Advising customers on landscape planning problems.								
54. Selling landscape designs.								
55. Interpretation of plans, specifications, and contracts.								
Are there others which should be included?								

APPENDIX D

APPENDIX D

MEMBERS OF THE JURY

Industry Members

Landscape Designer

Calvin Kappes
Kappes Landscapes
1125 Paterson, S.E.
Grand Rapids, Michigan

Nursery Manager

Fred Meyer
Cottage Gardens, Inc.
2611 S. Waverly Road
Lansing, Michigan

Salesman-Broker

Gene Ryan
Cottage Gardens, Inc.
2611 S. Waverly Road
Lansing, Michigan

Landscape Architect

Joe Skidmore
Robert's Landscaping, Inc.
RR# 2
Grand Ledge, Michigan

Landscape Designer-Contractor

John Versluys
Twin Lakes Nursery
3544 Michigan Rd., N.E.
Grand Rapids, Michigan

Student Members

Kent Armstrong
604 W. Main
DeWitt, Michigan

Shane Cultra
501 W. Seminary
Onarga, Illinois

Tom Schmidt
2504 Sherwood Road
Columbus, Ohio

Pete Smith
2276 Knob Hill, Apt. 11
Okemos, Michigan

Gary VanDerveen
540 S. VanDerveen
Mason, Michigan

APPENDIX E

APPENDIX E

LANDSCAPE AND NURSERY TECHNICIAN PROGRAM
FORMER STUDENT
TELEPHONE INTERVIEW SCHEDULE

Graduated:_____ Name_____

Withdrew:_____ Phone_____

Are you willing to participate in this study? Yes /_/ No /_/

1. What is your current mailing address?

_____
(Street) (City) (State) (Zip)

2. What is your present employment status?

	Related to Landscape & Nursery Industry	Unrelated to Landscape & Nursery Industry
Self-employed	2.1	2.5
Employed Full-time	2.2	2.6
Employed Part-time	2.3	2.7
Student	2.4	2.8

2.9 In Military /_/
2.10 Unemployed, but looking for work /_/
2.11 Unemployed, not looking for work /_/

Comments concerning job (if volunteered) _____

_____

3. What is your employer's name and address?

_____

_____

4. Did you continue your education at another institution of higher education after leaving the Landscape and Nursery program?

4.1 Yes /_/ 4.2 No /_/

5. What is your military status?
___5.1 Veteran
___5.2 In Service
___5.3 Eligible of draft
___5.4 Deferred
___5.5 Member of National Guard or Reserves.
___5.6 Not applicable

APPENDIX F

APPENDIX F

COVER LETTER FOR FORMER STUDENT SURVEY

MICHIGAN STATE UNIVERSITY EAST LANSING · MICHIGAN 48823

COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

INSTITUTE OF AGRICULTURAL TECHNOLOGY · AGRICULTURE HALL

We would like to thank you for agreeing to participate in the follow-up of former students of the Landscape and Nursery Technician program. Your response to the enclosed questionnaire is very important.

The purpose of this follow-up study is to gather information about you as a former student of the Landscape and Nursery Technician program. The knowledge of what has happened to the former students since leaving the program will assist in making decisions concerning the preparation of future students toward their chosen career. Information must be obtained from all former students - graduates, those who withdrew, those working in or studying for the landscape and nursery industry and those who are not. Therefore, we need your response if we are to have complete data with which to make decisions for the improvement of the Landscape and Nursery Technician Program.

The information you give on the questionnaire will be kept in strict confidence. The final report of the study will include only totals and summations for the various groups of former students.

Please complete the questionnaire at your earliest convenience and return it in the enclosed, addressed envelope.

Thank you again for your participation.

Sincerely,

Roy A. Mecklenburg

Roy A. Mecklenburg, Coordinator
Landscape and Nursery Technician Program

Donald E. Elson

Donald E. Elson, Student Advisor
Institute of Agricultural Technology

APPENDIX F

COVER LETTER FOR EMPLOYER SURVEY

MICHIGAN STATE UNIVERSITY EAST LANSING • MICHIGAN 48823

COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

INSTITUTE OF AGRICULTURAL TECHNOLOGY • AGRICULTURE HALL

Dear Sirs:

Recently, an employee of yours was asked to participate in a follow - up study of former students of the Landscape and Nursery Technician program. As a part of the study, employers of these former students are also being asked to participate.

The purposes of this follow - up study are to gather information about the former students and to determine the competencies and skills needed by the industry. The information obtained by this study will assist in making decisions concerning the preparation of future students toward their chosen career. Information must be obtained from all former students as well as the employers, if we are to have complete data with which to make decisions for the improvement of the Landscape and Nursery Technician Program. Therefore, we need your response.

The information you give on the questionnaire will be kept in strict confidence. The final report of the study will include only totals and summations for the various groups of former students and employers.

Please take thirty minutes at your earliest convenience to complete this questionnaire and return it in the enclosed, addressed envelope.

Thank you in advance for your participation.

Sincerely,

Roy A. Mecklenburg

Roy A. Mecklenburg, Coordinator
Landscape and Nursery Technician Program

Donald E Elson

Donald E. Elson, Student Advisor
Institute of Agricultural Technology

APPENDIX G

APPENDIX G

ACKNOWLEDGEMENT AND/OR REMINDER POSTAL CARDS

Former Student Card

LANDSCAPE AND NURSERY TECHNICIAN FOLLOW-UP SURVEY

I have received your completed questionnaire.
THANK YOU FOR YOUR COOPERATION.

As of today, _____, I have not received your completed questionnaire. Please complete and return it today. There are a limited number of former students to contact, therefore each individual's completed questionnaire is essential. The information obtained by telephone was preliminary, your answers on the questionnaire are the most important. Thank you in advance for your prompt return of the questionnaire.

Donald E. Elson

Employer Card

LANDSCAPE AND NURSERY TECHNICIAN FOLLOW-UP SURVEY

I have received your completed questionnaire.
THANK YOU FOR YOUR COOPERATION.

As of today, _____, I have not received your completed questionnaire. Please complete and return it today. There are a limited number of employers of former students, therefore each employer's completed questionnaire is essential. Recommendations for the Landscape and Nursery Technician program can not be formulated with incomplete data from you, the employer. Thank you in advance for your prompt return of the questionnaire.

Donald E. Elson

APPENDIX H

APPENDIX H

CHI-SQUARE TEST FOR SIGNIFICANT DIFFERENCE ON OUR VARIABLES BETWEEN RESPONDENTS AND NON-RESPONDENTS

Variables	Degrees of Freedom	Significance at .05 level χ^2	Respondents-Non-respondents χ^2
Graduation - Withdrawal	1	3.80	.1033 (NS)
Employment Status	2	5.99	1.3112 (NS)
Additional Education	1	3.80	2.4012 (NS)
Military Status	5	11.07	2.8038 (NS)

APPENDIX I

APPENDIX I

FORMER STUDENTS PARTICIPATING IN THE FOLLOW-UP STUDY

The number in parentheses indicates the year the former student left the program either by graduation or withdrawal. The addresses are correct as of March 1, 1971.

Douglas Aalderink (70)
Fennville, Michigan 49408

David Anderson (70)
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Bay city, Michigan 48706

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APPENDIX I

FORMER STUDENT PARTICIPANTS (continued)

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APPENDIX I

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APPENDIX I

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APPENDIX I

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Charles White(65)
4015 W. 13 Mile Rd.
Royal Oak, Mi. 48072

Bill Wilber (67)
512 E. Washington
Diamondale, Mi. 48821

Robert Williams (69)
Box 95
Oden, Michigan 49764

Robert Wilson (70)
116A Armstrong
Michigan State University
East Lansing, Mi. 48823

Timothy Wirt (70)
1958 Gunn Road
Holt, Michigan 48842
(Parents' address)

Bernard Withbrodt (69)
5039 S. Garfield
Auburn, Michigan 48611
(Parents' address)

Thomas Wressman (66)
3581 W. Big Beaves
Troy, Michigan 48084

Forrest Wyckoff (68)
3145 Cedar Lake Road
Howell, Michigan 48843

Samuel Yamin (69)
1047 Madison
Birmingham, Michigan 48008

John Zelenka (66)
16127 Winans
Grand Haven, Mi. 49417

Paul Zendt (70)
39191 Willowmere
Mt. Clemens, Mi. 48045

Donald Zbin (67)
18953 Hilliard
Rocky River, Ohio 44116

APPENDIX J

APPENDIX J

EMPLOYERS IN THE LANDSCAPE AND NURSERY INDUSTRY

The Andersons
Box 119
Maumee, Ohio 43437
(two former students)

J. E. Armstrong Landscape Co.
3726 Utica Rd.
Fraser, Michigan 48020

James H. Basset Landscape
Architect, Inc.
4010 Ada Rd.
Lima, Ohio 45801

Begick Garden Center, Inc.
5993 Westside Saginaw Rd.
Bay City, Michigan

Birmingham Country Club
1750 W. 14 Mile Rd.
Birmingham, Michigan

Cottage Gardens, Inc.
2611 S. Waverly Rd.
Lansing, Michigan

Dept. of Cemeteries and Parks
City of Coldwater
7 S. Monroe
Coldwater, Michigan 49036

Dept. of Parks and Recreation
26000 Evergreen Rd.
Southfield, Michigan 48075

Downing's Garden Center
Park Shopping Center
Springfield, Ohio 45504

Environment Control Corp.
270 E. Main St.
Painesville, Ohio 44077

Cal Fleming Landscaping and
Tree Service
4101 Barham
Detroit, Michigan 48024

Fruit Basket and Flower Land
765 W. 28th
Grand Rapids, Michigan

Gootjes Landscaping
2233 E. Paris, S. E.
Grand Rapids, Michigan

Jones Nursery
8100 Broadmoor
Caladonia, Michigan 49316

Raymond Kunst
356 Elizabeth
Rockford, Michigan 49341

Franz Lipp-Marvin Wehler
Partnership
27 W. 463 Jewell Rd.
Winfield, Ill. 60190

Chester Nelson Landscape
Associates, Inc.
1411 Dixie Hwy.
Flossmor, Ill. 60422

Walter Reder
4569 11 Mile Rd.
Auburn, Michigan 48611

W. W. Reetz Landscaping
30718 Harper
St. Clair Shores, Michigan 48082

Reinhold Landscaping
23206 Telegraph
Flat Rock, Michigan

Richter's Gardens Inc.
4801 S. Cedar
Lansing, Michigan 48910

Smith Tree and Landscape
6270 W. Grand River
Lansing, Michigan
(two former students)

APPENDIX J

EMPLOYERS (continued)

Strickfaden Nursery
318 Bell Ave.
Sandusky, Ohio 44870

Thornapple Nursery
6636 Brookhill Court
Grand Rapids, Michigan

Robert Tomayer
R. R. #2
Fennville, Michigan 49408

Twin Lakes Nursery
3544 Michigan, N. E.
Grand Rapids, Michigan 49506

Van's Pines, Inc.
R. R. #1
West Olive, Michigan 49460

Walnut Ridge Greenhouse
and Garden Center
2108 Hamburg Pike
Jeffersonville, Ind. 47130