INFORMATION TO USERS

While the most advanced technology has been used to photograph and reproduce this manuscript, the quality of the reproduction is heavily dependent upon the quality of the material submitted. For example:

- Manuscript pages may have indistinct print. In such cases, the best available copy has been filmed.
- Manuscripts may not always be complete. In such cases, a note will indicate that it is not possible to obtain missing pages.
- Copyrighted material may have been removed from the manuscript. In such cases, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, and charts) are photographed by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each oversize page is also filmed as one exposure and is available, for an additional charge, as a standard 35mm slide or as a 17" x 23" black and white photographic print.

Most photographs reproduce acceptably on positive microfilm or microfiche but lack the clarity on xerographic copies made from the microfilm. For an additional charge, 35mm slides of 6" x 9" black and white photographic prints are available for any photographs or illustrations that cannot be reproduced satisfactorily by xerography.
Powell, Ronald Lee

DEVELOPMENT AND EVALUATION OF A MICROCOMPUTER-MANAGED SEQUENCED COURSE OUTLINE

The Ohio State University

University Microfilms International 300 N. Zeeb Road, Ann Arbor, MI 48106

Copyright 1986 by Powell, Ronald Lee All Rights Reserved
PLEASE NOTE:

In all cases this material has been filmed in the best possible way from the available copy. Problems encountered with this document have been identified here with a check mark √.

1. Glossy photographs or pages ____
2. Colored illustrations, paper or print ______
3. Photographs with dark background ____
4. Illustrations are poor copy ______
5. Pages with black marks, not original copy ______
6. Print shows through as there is text on both sides of page ______
7. Indistinct, broken or small print on several pages __________
8. Print exceeds margin requirements ______
9. Tightly bound copy with print lost in spine ______
10. Computer printout pages with indistinct print ______
11. Page(s) _______ lacking when material received, and not available from school or author.
12. Page(s) ______ seem to be missing in numbering only as text follows.
13. Two pages numbered ______. Text follows.
14. Curling and wrinkled pages ______
15. Dissertation contains pages with print at a slant, filmed as received ______
16. Other ___________________________________________________________
    ________________________________________________________________
    ________________________________________________________________

University
Microfilms
International
DEVELOPMENT AND EVALUATION OF A MICROCOMPUTER-MANAGED SEQUENCED COURSE OUTLINE

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Ronald Lee Powell, B.S., M.S.

* * * * *

The Ohio State University

1986

Dissertation Committee: Approved by
L. E. Hedges
J. L. Henderson
L. H. Newcomb
Adviser
Department of Agricultural Education
To Deanna, my daughter, whose open arms
and warm smile provided me with pleasant diversions
and the inspiration to complete my doctorate program
ACKNOWLEDGMENTS

The personal achievement of an individual is usually the result of the combined efforts of many. The completion of this dissertation by the author is no exception. This achievement has been possible because of advisors, committee members, professors, friends and family who have encouraged, supported, and inspired me throughout my professional career.

The author is indebted to the Agricultural Education Department, The Ohio State University for providing the instructional and financial support necessary to carry out this doctoral program.

To Dr. J. David McCracken, who served as my major advisor for my master's and doctoral pre-candidacy programs. Through his encouragement to enter graduate school and his guidance through my graduate program, his high expectations of me have been fulfilled.
To Dr. Janet L. Henderson for her continual support by allowing me to utilize her classes for my research study. I am especially indebted to Dr. Henderson for her constructive criticism of the software program and her assistance in the numerous problems that were encountered in developing the software program.

To Drs. R. Kirby Barrick, Blannie E. Bowen, Lowell E. Hedges, James A. Knight Jr., Larry E. Miller, and J. Robert Warmbrod, faculty in Agricultural Education, at The Ohio State University who have assisted me in my professional growth.

To Dr. L. H. Newcomb for assuming the responsibility of becoming my advisor during my candidacy. Through his patience, friendship, and guidance to seek scholarly excellence this dissertation comes to fruition.

To my family especially my mother, Mrs. Idola Lowe, for their constant love and support during my doctoral program.

And to Mr. Ben Kovitz for his expertise in program languages, especially C. Through his assistance the developmental phase of this dissertation became a reality.
VITA

26 December 1944 ............. Born - Charleston, West Virginia

1969 ......................... B.S., The Ohio State University, Columbus, Ohio

1969 - 1976 .................. Plant Pest Control Inspector, Division of Plant Industry, Ohio Department of Agriculture

1976 - 1983 .................. Teacher, Dayton Public School System, Dayton, Ohio

1979 - 1983 .................. Lecturer on Plant Pathology, University of Cincinnati Evening College, Cincinnati, Ohio

1981 ......................... M.S., The Ohio State University, Columbus, Ohio

1983 - 1986 .................. Teaching Assistant, The Ohio State University, Columbus, Ohio

1986 - Present .............. Visiting Assistant Professor, Department of Vocational Education, University of Kentucky, Lexington, Kentucky
PUBLICATIONS


FIELDS OF STUDY

Major Field: Agricultural Education

Studies in Curriculum.............Gail McCutcheon
Research/statistics.......J. David McCracken
Teacher Education........L. H. Newcomb
Vocational Education.....Dewey A. Adams
TABLE OF CONTENTS

DEDICATION .................................................................. ii
ACKNOWLEDGMENTS ......................................................... iii
VITA ........................................................................ iv
LIST OF TABLES ................................................................. x
LIST OF FIGURES ............................................................ xvi
CHAPTER

I. INTRODUCTION ............................................................. 1
   Background and Setting .............................................. 1
   Statement of the Problem ........................................... 6
   Purposes of the Project .............................................. 7
   Research Objectives ................................................ 8
   Definitions .......................................................... 9
   Rationale for the Study ............................................. 10

II. RELATED LITERATURE ................................................. 14
   Classroom Uses of Microcomputers ......................... 14
   Computers in Curriculum Development ................... 17
   Basis for Curricular Revision .................................. 19
   Course of Study .................................................... 23
   Benefits of a Course of Study ................................... 27
   Related Studies ...................................................... 30
   Summary ............................................................ 34
III. METHODOLOGY ..........................................38
   Introduction .......................................38
   Development of the Software Program ............39
   Population ......................................46
   Design ...........................................47
   Data and Instrumentation .......................57
   Data Collection ................................66
   Data Analysis ...................................70

IV. FINDINGS ..............................................73
   Introduction .....................................73
   Description of the Population ..................75
   Findings of the Research Objectives ...........84
   Summary of the Findings .......................137

V. SUMMARY, DISCUSSION, CONCLUSIONS AND
   RECOMMENDATIONS ....................................142
   Summary of Introduction .......................142
   Summary of Methodology ........................144
   Summary of Findings ............................147
   Discussion .....................................150
   Conclusions ....................................158
   Recommendations ...............................159

APPENDICES

A. Computers and Their Relationship to Program
   and Curriculum .....................................163

B. Curriculum Development Model .....................167

C. Curriculum Cycle .....................................169

D. Suggested Uses of a Microcomputer-managed
   Curriculum Program ...............................171

E. Software Program Input Variables and Reports .....173

F. Computer-managed Sequenced Course Outline
   Program Reference Manual ..........................175
      1. Manual Table of contents ....................177
      2. List of Screens for Manual .................178

G. Ag.c Program Module ..................................203
LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLES</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reliability coefficient of instrument: attitude toward microcomputers</td>
<td>59</td>
</tr>
<tr>
<td>2. Reliability coefficient of instrument: software evaluation</td>
<td>60</td>
</tr>
<tr>
<td>3. Inter-rater reliability coefficient of instrument: software evaluation</td>
<td>61</td>
</tr>
<tr>
<td>4. Inter-rater reliability coefficients of instrument: vocational agriculture course outline score sheet</td>
<td>65</td>
</tr>
<tr>
<td>5. Age of subjects by group</td>
<td>75</td>
</tr>
<tr>
<td>6. Gender of the study participants by group</td>
<td>76</td>
</tr>
<tr>
<td>7. Grade point averages in college by group</td>
<td>77</td>
</tr>
<tr>
<td>8. Computer experience by group</td>
<td>78</td>
</tr>
<tr>
<td>9. Previous typing experience by group</td>
<td>79</td>
</tr>
<tr>
<td>10. Current computer use and computer training by group</td>
<td>81</td>
</tr>
<tr>
<td>11. Comparison of control group and experimental group on demographic variables</td>
<td>83</td>
</tr>
<tr>
<td>12. Perceived utility of the software program by the experimental group and the panel of experts</td>
<td>86</td>
</tr>
<tr>
<td>13. Planning time to develop a sequenced course outline</td>
<td>87</td>
</tr>
</tbody>
</table>
14. Comparison of planning time to develop a sequenced course outline for control and experimental groups..........................88
15. Typing time and computer entry time to prepare a sequenced course outline.........................89
16. Comparison of typing time and computer entry time to prepare a sequenced course outline for control and experimental groups...........90
17. Total time to plan and develop a sequenced course outline.................................91
18. Comparison of total time to develop a sequenced course outline for control and experimental groups....................92
19. Number of years which were sequenced by the two groups................................93
20. Comparison of the mean number of years which were sequenced by the control group and the experimental group.......................94
21. Weighted planning time (hours) to develop a sequenced course outline by the two groups........95
22. Comparison of weighted planning time to develop a sequenced course outline for the control and experimental groups.........................96
23. Weighted typing time and computer entry time to prepare a sequenced course outline for the control and experimental groups...........97
24. Comparison of weighted typing time and computer entry time to prepare a sequenced course outline for control and experimental groups.........................98
25. Weighted total time to plan and prepare a sequenced course outline.............................99
26. Comparison of weighted total time to develop a sequenced course outline for control and experimental groups...........100
27. Scores on criterion one, there are an adequate number of problem areas for each grade level, for the control and the experimental groups .................................101

28. Comparison of group means on adequate number of problem areas for each grade level.....102

29. Scores on criterion two, problem areas are logically sequenced within the school year, for the control and the experimental groups.......103

30. Comparison of group means for criterion two, problem areas are logically sequenced..............104

31. Scores on criterion three, problem areas are repeated when appropriate within a grade level and/or between grade levels, for the control group and the experimental group.....................105

32. Comparison of group means on the criterion, problem areas are repeated when appropriate......106

33. Scores on criterion four, problem areas for each year are appropriate for the intended grade level, for the control group and the experimental group..................................107

34. Comparison of scores on problem areas for each year are appropriate.........................108

35. Scores on criterion five, the overall selection of problem areas for the document is excellent, for the control and the experimental groups......................109

36. Comparison of group means for the selection of problem areas.................................110

37. Scores on criterion six, the document is legible (readable), for the control and the experimental groups..............................111

38. Comparison of group means for criterion six, the document is legible.........................112

39. Scores on criterion seven, the document has adequate margins, for the control and the experimental groups..............................113

xii
40. Comparison of group means for the document has adequate margins......................114

41. Scores on criterion eight, the document could be given to parents, administration, and students based on the overall format/appearance of the document, for the control and the experimental groups.................................115

42. Comparison of group means on criterion eight, the document could be given to parents, administration, and students.............116

43. Scores on criterion nine, the cover page and title (one for each year taught) pages are adequate, for the control and the experimental groups.................................117

44. Comparison of group means for the adequacy of cover page and title page........118

45. Scores on criterion ten, punctuation, grammar, and spelling are correct throughout the document, for the control and the experimental groups.................................119

46. Comparison of group means on criterion ten, punctuation, grammar, and spelling are correct..........................................120

47. Scores on the variable content (criteria one through five) for the control and the experimental groups.................................121

48. Comparison of group means on the variable content.................................122

49. Scores on the variable format (criteria six through ten) for the control and the experimental groups...........123

50. Comparison of scores on the variable format for the control and the experimental groups...........124

51. Scores on the combined variables, content and format, for the control and the experimental groups.................................125

xiii
52. Comparison of combined scores on the variables, content and format, for the control and experimental groups..............126

53. Weighted scores on the variable content (criteria one through five) for the control and the experimental groups..................127

54. Comparison of weighted scores on the variable content for the control and the experimental groups..........................128

55. Weighted Scores on the Variable Format (criteria six through ten) for the Control and the Experimental Groups...............129

56. Comparison of weighted scores on the variable format for the control and experimental groups....130

57. Weighted scores on the combined variables, content and format (criteria one through ten), for the control and the experimental groups...131

58. Comparison of weighted scores on the combined variables, content and format, for the control and experimental groups........132

59. Attitude toward microcomputers by group............134

60. Comparison of attitude toward microcomputers by group..........................135

61. Average number of problem areas sequenced per year for the control group and the experimental group.........................136

62. Comparison of average number of problem areas sequenced per year by group...........137

63. Summary of comparisons for the completed sequenced course outlines by group......140

64. Mean and standard deviations for the criteria statements by group.............................149

65. Weights used by the researcher for the criterion statements on the "vocational agricultural course outline score sheet"..............272

xiv
66. Experimental group and panel of computer experts mean scores and standard deviations for the "software evaluation" instrument ........274

67. Experimental group and control group mean scores and standard deviations for the "attitude toward microcomputers" instrument...279

68. Rank of subjects by total and weighted total scores on completed sequenced course outlines.....283
### LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURES</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Computers and their relationship to program and curriculum</td>
<td>163</td>
</tr>
<tr>
<td>2. Curriculum development model</td>
<td>167</td>
</tr>
<tr>
<td>3. Curriculum cycle</td>
<td>169</td>
</tr>
<tr>
<td>4. Suggested uses of a microcomputer-managed curriculum program</td>
<td>171</td>
</tr>
<tr>
<td>5. Software program input variables and reports</td>
<td>173</td>
</tr>
</tbody>
</table>
CHAPTER I

Introduction

Background and Setting

Much emphasis has been placed on instructional applications of the microcomputer in vocational agriculture. This emphasis has been primarily directed at the vocational agriculture student, with little or no emphasis placed on how the microcomputer could be utilized by vocational agriculture teachers to improve their "efficiency" (Passmore, 1983, p. 5) in the classroom. To become more efficient, vocational agriculture teachers must prepare themselves to use the latest advances in microcomputer technology (Peters, 1984). Once instructors become computer literate, "... the computer can be a useful time and labor-saving tool" (Gartin and Gartin, 1984, p. 32a) and "... make everyday chores easier, faster and more accurate" (Rosch, 1985, p. 8).

Most teachers have already used or are contemplating the use of microcomputers in their instructional programs to assist students in learning repetitive skills or the mastery
of facts (Phillips, 1982). However, the scarcity of microcomputer applications as instructional aids has been identified by Moursund (1983). Furthermore, Moursund (1983) suggested that "... so far computers have had very little impact upon the curriculum in most schools. Most teachers do not make use of computers as an aid to instruction" (p. 2).

Current microcomputer applications by vocational agriculture teachers have not taken full advantage of the potential of the microcomputer as an instructional aid, such as in developing a sequenced course outline or a curriculum. Martin (1984) stated that "probably one of the most frustrating and neglected tasks for the vocational agricultural [sic] teacher is curriculum development" (p. 32c).

Although a course of study must be on file in each Ohio vocational agriculture department in compliance with Section 3313.60 of the Ohio Revised Code ("Process model," 1983), the forms and uses have been as varied as the teachers and school districts in the state. The courses of study and/or curriculum guides vary from a list of instructional topics for vocational agriculture to extensive unit plans including behavioral objectives, references, and teaching strategies.
(Martin, 1984). Because of the diversity, there is some need to provide structure, assistance, and some measure of consistency in the area of curriculum development.

The exercise of developing a sequenced course outline by preservice vocational agriculture teachers has been especially frustrating because the exercise has been very time consuming and unrealistic. McCracken (1978) stated "... that students at the preservice level do not have a real situation, other than their student teaching center which may be used in building a course of study" (p. 20). Most, if not all, preservice teachers do not know where they will be teaching and hence whether their sequenced course outline would ever be of much use. The preservice teachers, in most situations, would need to develop a new and more relevant sequenced course outline/course of study during their first year as teachers (Henderson, 1986). However, McCracken (1978) also suggested "...that the preparation of students in course of study development is not the sole responsibility on the instructor in one preservice course" (p. 20). Competence in curriculum development by students is gained by exposure to early experience programs, methods courses, student teaching, beginning teacher programs and graduate courses in curriculum development.

This emphasis on curriculum development during the first year of teaching becomes especially evident in view of
the declining number of hours that preservice teachers have spent in-class sequencing a course outline and/or a course of study. McCracken and Bartsch (1976) suggested that six hours of class time should be spent by preservice vocational agriculture teachers on sequencing topics by both year of instruction and topics within each year of instruction; Hedges (1986) stated that he required approximately two hours of class time on sequencing, and Henderson (1986) was spending approximately one-half hour of class time on sequencing. The amount of in-class time devoted to teaching how to develop a sequenced course of study implied that a subsequent reduction of out-of-class time devoted to course sequencing had also occurred. The reduction in out-of-class time ranged from approximately six hours for Hedges (1986) to three hours for Henderson (1986).

To develop and/or revise a course of study during their first year of teaching a vocational agriculture program, new teachers were spending approximately 200 hours (McCracken, 1986). McCracken (1986) felt that there probably has been no change in the total number of hours that a new teacher is spending on developing a course of study, however, the quality has either remained the same or has improved. McCracken (1986) attributes the possible improved quality of the course of
study to increased help available in the form of state curriculum guides, proficiency records and good quality task lists.

Yoder and McCracken (1975) stated that "occupational information is needed to develop and revise vocational and technical education curricula in agriculture" and "the information . . . may be used by curriculum development specialists, teachers, local and state administrators, and others involved in planning and conducting vocational and technical programs in agriculture" (p. 1). Yoder and McCracken (1975) conducted a study that identified the technical competencies needed by workers to enter and advance in agricultural occupations. A by-product of this study was a list of tasks common within each of the occupational areas of agriculture (agricultural production; agricultural business, supply, and service; agricultural mechanics; and horticulture). The existing data base of tasks, namely, the task lists developed by Yoder and McCracken (1975), and the increased availability and utilization of computers by vocational agriculture teachers provides the impetus for the development of a course of study with the aid of a computer (Kirst & Walker, 1971). While task inventories have existed for the various agricultural taxonomies, task inventories have not been centralized and/or computerized for convenient use by the
state, district, or local boards of education or individual classroom teachers for the development of their respective sequenced course outlines or courses of study. As a consequence, the benefit of computerized task lists to vocational agriculture curriculum developers has been minimal (Karelse & Olson, 1984).

According to McCracken (1984), utilization of the identified tasks was quite limited (if at all) for the development of agricultural curricula. This lack of utilization of identified tasks was not unique to Ohio; Karelse and Olson (1984) reported that ". . . while all this information [task lists] exists, it has not been centralized and computerized for convenient use" (p. 22). "The need for base data [task lists] is definitely needed during a time of concern for quality education" (p. 22), stated Hanson, reactor to the Karelse and Olson (1984) research presentation. To construct quality vocational education programs, "substantial information is absolutely essential . . ." (Hanson, reactor to Karelse & Olson, 1984, p. 22).

Statement of the Problem

The lack of utilization of the microcomputer as an instructional aid by the vocational agriculture teachers to increase their efficiency has not been due to the deficiency of data bases (task lists, reference lists, etc.) and/or
microcomputer availability. Vocational agriculture teachers have not had task lists, reference lists or other resources available to them that are computerized. Without the computerization of these data bases (task lists, reference lists, etc.) for the vocational agriculture teacher(s), the microcomputer cannot be utilized as an instructional aid in developing sequenced course outlines and/or courses of study.

**Purposes of the Project**

The purposes of this research project were (a) to develop a software program that would assist preservice vocational agriculture teachers in the development of sequenced course outlines by meeting the minimum requirements of Agricultural Education 585, Instructional Program Planning for Vocational Agriculture, (b) to determine the extent to which the software program was accepted and used by the preservice vocational agriculture teachers to assist them in developing their sequenced course outlines, (c) to determine if the software program improved the efficiency, by saving time, in developing and/or revising the sequenced course outlines of preservice vocational agriculture teachers, and (d) to assess the completed course outlines which were developed by the control and the experimental groups.
Research Objectives

The following research objectives were used to develop the software program and to validate the development of the software program.

(1) Develop a microcomputer-managed sequenced course outline program which would meet the minimum requirements of Agricultural Education 585, Instructional Program Planning for Vocational Agriculture.

(2) Determine the utility of the software program as perceived by the preservice vocational agriculture teachers who used the microcomputer-managed sequenced course outline program and as perceived by a review team of experts on computers.

(3) Determine the amount of time required to plan and type the class assignment by traditional methods as compared to the time required to plan and enter the class assignment using the software program.

(4) Assess the completed sequenced course outlines which were developed by the control group and the experimental group by curriculum development experts in the Department of Agricultural Education, The Ohio State University and the Agricultural Education Division, Ohio Department of Education.
(5) Determine the attitudes of the preservice vocational agriculture teachers included in this study toward microcomputers.

(6) Determine the average number of problem areas sequenced per year by the preservice vocational agriculture teachers included in this study.

Definitions

Operational definitions were developed by the researcher with the intent of facilitating a clear and concise meaning of the following terms used in this study.

Course of study. A document which includes the sequenced course outline (an orderly sequence of problem areas which is based on program philosophy, goals and program objectives), instructional strategies and evaluation strategies.

Instructional topics or units. Major areas of an occupation, consisting of related problem areas. Instructional units consist of several related problem areas.

Preservice vocational agriculture teachers. Senior students majoring in agricultural education.

Problem Area. A division of an instructional unit. A larger segment of an occupation, consisting of a group of related tasks.
Sequenced course outline. An orderly sequence of problem areas that are to be taught based on program philosophy, goals and program objectives. The sequenced course outline will also indicate the task(s) related to the problem area and the instructional topic.

Software program. The microcomputer-managed sequenced course outline program that was developed by the researcher for this study.

Task. A division of a problem area. A unit of work performed by students in the completion of a specific job.

Rationale for the Study

Research and/or information in the literature concerning the use of a microcomputer as an aid to instruction, specifically as an aid to developing a sequenced course outline, was generally non-existent. There was, however, a sufficient amount of support by researchers and educators for development of a microcomputer-managed curriculum to aid vocational agriculture teachers.

"Education is labor intensive" (Burnham, 1981, p. 15) and "... the teacher spends at least a third of his [sic]
class time not teaching. He [sic] acts as a host, clerk, librarian, counselor, housekeeper, decorator, ticket seller, attendance taker, data processor, analyzer and policeman. In tomorrow's classroom, many of these activities can be automated" (Bushnell, 1963, p. 61).

Usage of the new computer technology could increase teacher efficiency and effectiveness in the classroom (Bushnell, 1963), primarily through the use of computers in the vocational agriculture classroom as an instructional tool and as an object of instruction (Phillips, 1983). However, so much emphasis has been placed on instructional applications, primarily directed at the student, that little or no emphasis has been placed on how the computer could be utilized more fully by the vocational agriculture teacher in developing a sequenced course outline or a curriculum. "It is our responsibility as agricultural educators to find the most appropriate uses for this innovation" (Wade, 1980, p.1).

If vocational agriculture teachers are to utilize the microcomputer as an instructional aid to become more efficient in their use of time, then new classroom uses for the microcomputer have to be found for vocational agriculture teachers. One such area of microcomputer application that received very little attention was the idea of developing sequenced course outlines and curricula. The
lack of attention to curricula concerns was emphasized by Moursund (1983) through his comment that with all of the progress in computerized-based systems, there had been almost no impact upon the curriculum. "A computer is nothing more than a tool, just like pen and ink. It gives you the same advantages that a carpenter gets from substituting a power saw for a handsaw - it will cut the time you spend on what you do" (Rosch, 1985 p. 8).

The microcomputer has provided "... science with a powerful tool for coping with the complexity of knowledge and the ever expanding information base" (Molnar, 1978, p. 7). The microcomputer as a tool is no less important to education. "However, the computer, which has become indispensable to the operation of science, business, and government, does not play a major role in American education" (p. 7).

Vocational agriculture teachers have been faced with a plethora of decisions to be made in regard to their curriculum guides, including: (a) what to teach, (b) when to teach a subject, (c) how much time to spend on a subject, (d) what type of evaluation to use, (e) which teaching strategy to use, (f) what resources and/or materials are needed, (g) and which learning strategies [concrete sequential, concrete random, abstract sequential or abstract random (Gregorc & Butler, 1984)] to use. Baker (1978) has
stated that "the greater the number of units in the curriculum, the greater the amount of instructionally related data generated in the classroom. The more complex the structure, the greater the amount of record-keeping necessary to track the student through the curricular plan" (p.26). The microcomputer in the "... interactive mode can manipulate large amounts of data, ... and reduce to human proportions the volume of information that seems to be growing before our eyes" (Burnham, 1981, p. 15). Gartin and Gartin (1984) has specifically suggested that "curriculums can be put on the computer and changed easily" (p. 32a).

Therefore, the researcher felt the development of a program that used a microcomputer to design sequenced course outlines was a needed area of research and development. Furthermore, the researcher felt that such programs should be evaluated by a group of undergraduates majoring in agricultural education. The results of this study determined (a) whether the development of a microcomputer-managed sequenced course outline was feasible, (b) to what extent a software program was accepted by undergraduates in agricultural education and, (c) to what extent the software program saved time in developing, updating, and/or revising a sequenced course outline.
CHAPTER II

Related Literature

Classroom Uses of Microcomputers

Identified uses of microcomputers by researchers and educators for instructional purposes in a classroom include:

1. Computer-assisted instruction (CAI) - CAI includes drill and practice, simulations, gaming, demonstrations and tutorials (Hilgenfeld, 1984; Moursund, 1983; Dede, 1983; Nasman, 1982; California School Boards Association, 1982; & Lipsitz, 1982).

2. Computer managed instruction (CMI) - These management functions include materials creation, grade management, quiz banks, student testing and diagnosis/prescription. (Telem, 1984; Hilgenfeld, 1984; Dede, 1983; & Becker, 1982). Baker (1978) described CMI as "... a total educational approach in which a computer-based management information system is used to support the management functions performed by the teacher" (p. 14).
3. Occupational uses including budgets and files (Nasman, 1982), word processing (Hilgenfeld, 1984; Trueblood & Flanagan, 1983), spreadsheets (Henderson, 1985; & Dede, 1983), and database management (Hilgenfeld, 1984; & Dede, 1983).

4. Instruction in the programming of microcomputers, that is, the microcomputer as an object of instruction, specifically, teaching of microcomputer programming and computer-related information skills (Hilgenfeld, 1984; Becker, 1982; & Roecks, 1981).

A model (Appendix A) that illustrated the relationship of a microcomputer to the program and curriculum was developed by Hilgenfeld (1984). In the model, most if not all computer uses for education could be placed in one or more of the categories presented by the model. The two major categories were (a) computer uses for instructional purposes and (b) instruction in programming computers. The model further subdivided instructional purposes into (a) instructional demonstration, (b) to complement and enhance presentation of subject matter and (c) to aid in facilitating instruction. There was overlap from one category to another (for example, problem solving and simulation).

In a research study completed by Henderson (1985) where she sought to determine how microcomputers were used by
vocational agricultural teachers in Illinois, one of the conclusions was that the "instructors are using the microcomputer for instructional purposes and as a management tool (i.e., record keeping and grade averaging)" (p. 10). Specifically, the following instructional uses were identified: teaching feed rations, insect control, marketing, cost analysis, and management of horticultural crops. Additional instructional uses were games (instructional and/or non-instructional) and drill and practice exercises. The microcomputer uses as a management tool were keeping test scores, grading, keeping class rosters or other class records, generating mailing lists and membership rosters, maintaining supervised occupational experience records, tabulating results of Future Farmers of America contests, and maintaining inventory of the laboratory equipment. Another research study by Foster and Miller (1985) of the most common uses of the microcomputer in vocational agriculture programs in Nebraska and Iowa reported the following uses: group and/or classroom instruction, independent study, use in a microcomputer unit in vocational agriculture, department filing, recording student grades, and maintaining departmental inventories.

The list of microcomputer uses by vocational agriculture teachers as reported by Foster and Miller (1983) are similar to the list of microcomputer uses reported by
Both lists of microcomputer uses identified can be categorized under broader headings, such as (a) instruction and (b) management in the vocational agricultural classroom. Two categories by Foster and Miller (1983) and Henderson (1985), instruction and management, correspond to two categories presented by Hilgenfeld (1984), that is, they complement and enhance presentation of subject matter and aid in facilitating instruction. One important observation was that there were no computer uses found by the researcher in the literature reviewed that dealt specifically with sequenced course outlines or curriculum development.

**Computers in Curriculum Development**

Tucker (1983) stated that "... there is virtually no administrative or instructional function performed by the schools that cannot be enhanced in some way with the computer" (p. 313). Suggested computer applications related to curriculum development in the classroom include: Planning, organizing, conducting and evaluating curriculum (Finch & Crunkilton, 1985); generating research data for curriculum including scope (Splittgerber & Stirzaker, 1984); and reorganizing subject matter content, experimenting with linear programming, and developing multi-group scheduling (Harnack, 1965).
The data bases and record-keeping systems must serve some larger end than just record-keeping; otherwise, the teacher is robbed of valuable time that could be spent elsewhere (Armstrong & Pinney, 1977). The data that are stored in the computer can be used by curriculum developers to (a) modify and evaluate the curriculum (Bushnell, 1963), (b) permit an ongoing review of content and scope and sequence, (c) generate new content, and (d) generate new sequences (Splittgerber & Stirzaker, 1984).

Computers will not replace teachers, even partially (Zahniser, Long & Nasman, 1983), but are sophisticated tools to be used by the teacher to allow the teacher to do a better job in the classroom (Lidtke, 1981). Zahniser and others (1983) concluded that schools will make the use of microcomputers, videodiscs, computer-assisted instruction, computer-managed instruction, and other high-technology systems standard practice. Since the sequenced course outlines and curriculum materials will be computer-based rather than print-based, they will be kept up-to-date.

The key to survival for teachers in the 21st century is educational research and development, including the application of high technology. The appropriate use of high-technology is the hope of the future in education. Since high-technology can help teachers cope with the
complexity of the information age, technology is cost-effective. The employment of such high-technology would enhance educational productivity (Burnham, 1981).

Donhardt (1984) stated that "if the promise of computer-aided education is to be realized, educators must be pro-active in building computer-based curricula that place technology in a supportive, facilitating role" (p. 30). Therefore, to help teachers in their pre-planning of large, small and individual teaching-learning situations and to "... overcome the persistent drudgery . . ." (Harnack, 1965, p. 5) associated with decision making in choosing the subject matter, organizing the subject matter, determining curricular approaches, choosing developmental activities, culminating activities, preparing instructional materials, selecting classroom techniques, and planning evaluation, incorporation of high technology in education is necessary.

**Basis for Curricular Revision**

Beauchamp (1983) has described several levels of curricular planning. The first level of curriculum planning is "simple curriculum modification" (p. 23). This level of change occurs when the existing curriculum, a "document" (p. 23), is relatively new. The changes made are usually simple, that is, minor changes in language, or changes in sequence due to past experiences with the curriculum, or
addition of new ideas. The second level of curriculum planning is "broader curriculum review" (p. 23). This level of change occurs when an existing curriculum has been in use for a length of time and the time has come to revise the entire curriculum. The changes that occur are to update the curriculum content in light of new developments resulting from research and other sources, and/or to change the curriculum format in light of the additional experiences of teachers. The third level of curriculum planning, "complete curriculum analysis and development" (p. 23), occurs when no curriculum exists or where the curriculum is very old and not currently used.

The word curriculum, according to Bruner (1971), was derived from a "course to be run" (p. 35), whereas Kirst and Walker (1971) stated that curriculum means "race course" (p. 482). An implied meaning of a race course is something that is "fixed and standard" (p. 482). Schools have largely "... regarded their curriculum as fixed quantities, not variables to be adjusted in the interest of achieving some goal" (p. 482). The concept that the curriculum is fixed and standard no longer is true. Tyler (1975) stated that "a curriculum must be ever relevant in the best sense of that word" (p. 27).
Many researchers agree that there is no one best curriculum for all students, for example:

1. Research evidence clearly shows that there is no single best curriculum for all students, or even for all students in a particular subject area. . . . Many different curriculum configurations can work well if they fit the students and the teachers working with them (Sanders & Chism, 1985, p. 28).

2. We agree that curriculum cannot be standardized for the country or the province or a board . . . (Dubois, 1974, p. 91).

3. Curriculum must be developed to meet the needs of the student rather than the desires of the developer. . . . If the needs of students are met, the curriculum will meet the objectives. . . . No other field of education has ever concerned itself more completely with correlating the curriculum and the aspirations of the learner (McMahon, 1972, p. 2).

4. There is no 'one best way', however. There never was and never will be 'one best way' of doing anything in education because people are different! (Frymier, 1977, p. 47).

5. . . . if a curriculum is to be effective in the classroom it must contain different ways of activating children, different ways of presenting sequences, different opportunities for some children to 'skip parts' while others work their way through, different ways of putting things (Bruner, 1966, p. 71).

6. . . . a curriculum or an instructional approach can't be standardized and remain effective, even within a single classroom. There's always that child who needs something different (Ohanion, 1985, p. 316).

Therefore, a "good curriculum" (Sanders & Chism, 1985, p. 28) cannot be created by a centralized entity and exported. Tyler (1975) suggested that curriculum
development is not based on precise rules, but involves artistic design, critical analysis, human judgment and empirical testing. Curriculum development is not a theoretical study but a practical enterprise according to Tyler (1975) and a particular curriculum design will not be the result of any one theory or set of ideas (Kerr, 1978). The lack of a theory or theories for curriculum development is a result of education developing as a technology rather than as a science. Most of what has been done in schools has come about from experience in running schools rather than from scientific theories (Beauchamp, 1968).

"The most valuable assets a teacher possesses are those related to his [sic] total experience", stated Herriot (1982, p. 84). These experiences by the teacher will permit decisions to be made about what should be included in the curriculum, "... made on the basis of what is subjectively thought to be right or wrong, desirable or undesirable, good or bad" (Beauchamp, 1968), whereas curriculum decisions according to Stephens (1985), are philosophical ones that are based on choices of value and worth of the objectives and on the judgments of the people involved.

This approach to curriculum development has been termed the "classical" approach by Renckly and Orwig (1981) and is characterized by determining instructional sequences by "human intuition" (p. 1). This is not a perfect process, in
that seldom is an adequate sequence produced the first time. However, Smith and Moun (1982) suggest that a teacher not only needs to know the content but also must analyze and rebuild the sequence with new relationships.

One of the goals of vocational agriculture teachers is that of organizing a curriculum which provides the educational experiences that enables their students to achieve educational objectives (Ridenour, 1965). A poorly sequenced curriculum can damage the realism of a learning experience and possibly reduce the ability of the students to internalize the concepts presented. Furthermore, "the student may appear to perform satisfactorily in the school environment but become disoriented in trying to perform a similar task in the real-world environment, thus the need for a well sequenced curriculum" (Renckly and Orwig, 1981, p. 1). Therefore, more demands will be placed upon vocational agriculture teachers to provide "...an optimally organized sequence" (Ryan, 1965, p. 52).

Course of Study

A curriculum guide consists of two major areas: a course of study and an instructional guide. The development of a course of study through program planning or curriculum
development provides a basis for the instructional guide and provides direction to daily classroom instruction ("Process Model," 1983).

The curriculum development model (Appendix B) diagrams one way of developing the course of study and the instructional guide. The model provides a basis for the course of study development. The model shows that courses of study are developed so that there is a correlation and an interrelationship between the various components. Courses of study are required by law in Ohio, whereas development of instructional guides are not legally required. However, school districts may elect to develop instructional guides to supplement their courses of study.

The major differences between a course of study and an instructional guide are:

<table>
<thead>
<tr>
<th>Course of Study</th>
<th>Instructional Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prescribes what is to be taught in a given subject or program.</td>
<td>1. Suggests how a given subject or area or study may be taught.</td>
</tr>
<tr>
<td>2. Defines the subject or program in terms of philosophy, goals, and objectives.</td>
<td>2. Contains suggestions as to instructional aids, materials, learning experiences, and teaching methods.</td>
</tr>
</tbody>
</table>
3. Can be changed only by action of the board of education. 3. Is revised, altered, or amended as necessary at the direction of school personnel (p. 13).

School districts in Ohio are required to update courses of study every five years [(Rule 3301-35-02(B)(1)(C), p. 17]. Appendix C presents a model of the four activities that are to occur in the curriculum cycle. The four activities are curriculum review, course of study revision, instructional update, and materials selection and adoption. The logical sequence of activities is designed to maximize control over curriculum development by the local school districts. The Ohio Department of Education ("Process Model," 1983) has suggested that any alteration in the sequence could result in reduced local control and a lessening of the ability to meet local student needs.

Curriculum review enables school districts to evaluate their current programs. Each program is reviewed in two ways: a needs assessment and a program evaluation.

A needs assessment is conducted as a quantitative measurement to determine the scope of the needs in each program and the extent to which those needs are being addressed. A program evaluation is conducted as a qualitative measurement to determine the degree to which the program goals and objectives are being attained. (p. 17)
The Ohio Department of Education ("Process Model," 1983) has suggested that each course of study should include the following components:

1. Cover sheet
2. Statement of approval by the board of education
3. Table of contents
4. Introduction
5. District philosophy and goals
6. Program philosophy
7. Program goals
8. Scope and sequence
   - program objectives
   - subject objectives

In addition to a course of study being required by law, the Ohio Department of Education ("Process Model," 1983) lists four reasons that make the course of study essential to the educational program of a school district. The four reasons for a course of study are:

1. Identifies the skills and concepts that teachers are responsible for teaching.
2. Gives an accurate description of the content that will be covered during a school year to parents and students.
3. Ensures commonality and continuity in the educational program available to students within school districts.

4. Provides the foundation for the locally developed competency-based education programs.

Benefits of a Course of Study

For a vocational agriculture teacher to benefit from a course of study, the document must be used. Hedges (1985) suggests that vocational teachers should develop and use a curriculum guide for a variety of reasons. The curriculum guide:

1. tells vocational agriculture teachers where they are and where they are going;
2. tells students what is being taught;
3. identifies what students are learning to parents;
4. aids the vocational agriculture teacher in knowing when to order films, schedule guest speakers, prepare for class experiments, schedule transportation for field trips, and so forth;
5. aids substitute teachers in that the curriculum guide shows them what has been taught and what should be taught;
6. aids cooperating employers in that they know what has been taught;
7. shows administration where funding is to be used;
8. aids professions in achieving the goal of vocational agriculture education: preparing individuals for, and helping them obtain, meaningful employment;
9. development and use is part of the job for a vocational agriculture teacher; and
10. development and use is the law.

Once the course of study is developed, "if properly sequenced, the curriculum becomes meaningful to students. One unit builds on another and students understand what is expected of them and where the class will lead them" (Martin, 1984, p. 32d). An important use suggested by Martin (1984) is as a public relations tool, that is, copies of the sequenced course outline or the course of study can be shared with students, parents, employers, school board members and other persons interested in vocational agriculture. Additional uses for a sequenced course outline or a course of study that are "... properly written, utilized and shared . . ." (p. 32d), are record keeping, assistance for teachers to meet the needs of students, enhancement of program offerings and improvement of the image of vocational agriculture.

Other uses for a sequenced course outline or a course
of study have been identified by preservice vocational agriculture teachers (Henderson, 1985). The sequenced course outline:

1. identifies what students are learning to parents;
2. aids vocational agriculture teachers in knowing when to order films, supplies, and equipment;
3. informs students what is being taught;
4. shows administration where funding is to be utilized;
5. aids vocational agriculture teachers in selecting and scheduling guest speakers;
6. helps vocational agriculture teachers in preparing for demonstrations/experiments;
7. aids vocational agriculture teachers in maintaining appropriate student behavior;
8. helps vocational agriculture teachers schedule transportation for field trips;
9. aids cooperating employers by identifying skills that have been practiced;
10. aids substitute teachers by showing what has been taught and what should be taught;
11. serves as a recruitment tool; and
12. helps vocational agriculture teachers to deliver instruction in an organized, efficient manner.
The benefits to a vocational agriculture teacher of having an up-to-date course of study are many. Hedges (1985), Martin (1984) and Henderson (1985) emphasized that a course of study was important for communication, specifically among students, parents, administration, cooperating employers, and other interested persons. McCracken and Bartsch (1976) wrote that "a course of study is a means of communication" (p. 1) and McCracken (1978) stated that "in addition to the value of a course of study in providing a 'roadmap' for the teacher [vocational agriculture teacher], it [course of study] can also serve as an effective means of communicating information about the vocational agriculture program to others" (p. 18).

Related Studies

The concept of developing and of evaluating a computer-managed course outline program was strongly influenced by a project, "Computer Assisted Curriculum" (CAC), completed by Karelse and Olson (1984). They developed a computer-based system to analyze a task list data base consisting of task lists from Michigan vocational curriculum guides and catalogs of performance objectives developed by members of the Vocational-Technical Consortium of States. The computer-based system had several components. The first component allowed for the analysis of all tasks in the data
bank through the use of descriptors from the *Handbook of Occupational Keywords* published by the United States Department of Labor. A second component of the system was a link to tool and equipment lists. A third component of the system was a link from the task list data bank to the information contained in *Vocational Preparation and Occupations* (VPO) published by the National Occupational Information Coordinating Committee (NOICC).

According to Karelse and Olson (1984) the "... computer-based system provides for the first time an ability to access and manipulate information required for sound vocational curriculum development. It [computer-based system] is one of the most important and significant advances in vocational development in recent years" (pp. 2-3). Karelse and Olson (1984) used three existing data bases (Michigan task list data bank, *Vocational Preparation and Occupations*, and *Handbook of Occupational Keywords*) to develop their computer-based occupational data analysis system. The importance of their study was that the data base information could be used by vocational curriculum developers to ensure that vocational curriculum was relevant to the needs of employers and the employment potential of the labor market. Curriculum developers could access and use information, such as: products, processes, tools and equipment, environmental conditions, education, language,
reasoning, mathematics, physical demands, General Aptitude Test Battery indicators for the job, and could serve as a link to other coding systems used by the Departments of Education, Labor and Commerce concerning labor market information. This information would allow curriculum developers "... to develop training programs relevant to the needs of employers and their employment potential" (p. 3).

A second project, computer-managed teacher education curriculum, by Parker, Varnell and Rinewalt (1983) at the University of Texas at Arlington, took a different approach to using computers in curriculum development, specifically in the teacher certification program. The rationale of the researchers for the project was based on the premise that rapid expansion of the amount of information needing attention due to "... the exponential expansion of available information ..." (p. 10), in their graduate and teacher certification curricula was affecting the teacher educators.

The effectiveness of these curricula [graduate and teacher certification] depends in a very fundamental way upon the recognition that they are, like any curricula, information systems. An information system is a body of related data such as an instructional methods course, or an introduction to education course, or, with others, a teacher certification curriculum. (Curricula are not, it should be remembered, knowledge and skills; these are the products as learners interact with the information.) As information systems, the
graduate and teacher certification curricula should be manuals as such. This requires that their creators, the education faculty, identify and define the information they contain at a level of explicitness and surpassing common, gross descriptions, such as course titles and catalog synopses. (p. 10)

The purpose of the project by Parker and others (1983) was to create a computer software program on the mainframe computer with which the secondary teacher certification curriculum could be managed, reviewed, and renewed. This project required faculty members to identify student competencies and subcompetencies and then to turn these into topics, sub-topics, and content. The content level "would constitute the operational definitions of what would be taught in the curriculum and would be referenced by specific bibliographic citations" (p. 11).

Courses were identified by grouping topics and sub-topics, which provided for a "spiraling" (p. 11) curriculum. Grouping of topics and sub-topics associated with a knowledge level of a specific competency could be included in earlier courses in the curriculum, thus laying a foundation for topics and sub-topics associated with the same competency developed later in the curriculum.

Once the faculty members had identified and defined the curriculum, a computer software program which would store, access and cross-reference particular information components of the curriculum was developed. The information components of the software program included professional standards of
state and national agencies, courses in the curriculum, course exams, a program exit exam, references, competencies, sub-competencies, topics, sub-topics and content.

The software program permitted the storage, retrieval and cross-referencing of the secondary teacher certification curriculum at the University of Texas at Arlington. Further, the software program permitted the faculty to monitor, manage, and renew the teacher certification curriculum.

Summary

Cromwell (1984) stated that "the course of study today must address the needs of students. In vocational agriculture, developing a complete course of study takes time, and time is at a premium for the vocational agriculture teacher" (p. 15). Vocational agriculture teachers are required by law in Ohio to develop a course of study and many school districts may also require an instructional guide or a course of study that differs significantly from the county course of study ("Course of study development," 1980).

The incorporation of high technology in the classroom is not a new concept. Harnack (1965) suggested that ". . . electronic equipment could be used to overcome the drudgery inherent in certain functions a teacher performs as he [sic]
organizes a teaching-learning situation" (p. 4). And Harnack (1965) goes on to further state that if a computer could be used to overcome the "drudgery" inherent in some teacher functions, "... then one of the most difficult tasks which a teacher faces - finding the time for pre-planning the actual teaching-learning situations in the classroom - could be alleviated" (p. 4).

Teachers are confronted by dual expectancies: (a) to organize and present subject matter, and (b) to individualize instruction. To assist the teachers in the performance of these roles, Harnack (1965) demonstrated the effectiveness of applying computers "... to relate pre-planning of subject matter, materials, and means of presentation to the needs and receptive abilities of individual pupils, small groups, and large groups..." (p. 1). The functions of teachers included:

1. identify subject matter;
2. define the abilities, needs, characteristics and interest of students as related to subject matter;
3. suggest learning outcomes in the form of behavioral skills; and
4. make decisions related to those tasks or areas that are important for the objectives and the students.

The functions of computers as suggested by Harnack (1965) include:
1. provide subject matter outline or problem census;
2. suggest large group introductory and developmental activities;
3. suggest small group introductory and developmental activities;
4. suggest individual learning group activities;
5. suggest suitable instructional materials and reference materials for individual students;
6. suggest appropriate equipment and audio visual materials for large group and small group instruction;
7. suggest suitable references;
8. suggest possible ways proposed outcomes may be evaluated; and
9. suggest possible paths to other related units.

Although the computer program developed by Harnack (1965) assisted the teacher in planning and developing much more than a course of study, the program allowed the teacher to access a "reservoir of ideas" (p. 3) in order to make decisions. The computer cannot make decisions for the teacher, but instead provides a source of information, ideas or suggestions from which a teacher may choose. Gagne and Briggs (1974) have stated "... that some theoretical basis will one day be proposed to replace the 'common-sense logic' which now underlies the design of sequences of topics for courses" (p. 141). Until such a theory is proposed, the
basis for design of sequences within courses rests upon judgments of "how much" (p. 141) can be accomplished within a single unit.

The computer-managed course outline developed for this study provided a data base of instructional titles, problem areas, and tasks that assisted preservice vocational agriculture teachers in planning, developing, and revising their sequenced course outlines. The researcher made no attempt to develop a computer-based program that would assist preservice vocational agriculture teachers in planning and developing an instructional guide due to the variation in requirements of the local school districts. Since the sequenced course outline provides a basis for an instructional guide and daily classroom instruction, then assisting vocational agriculture teachers, through the incorporation of microcomputers in the decision making process, that is planning, developing, revising and/or updating their sequenced course outlines would further improve their efficiency and help remove some of the drudgery that is associated with curriculum development.
CHAPTER III

Methodology

Introduction

There were two phases to this study. The first phase was the development and pilot testing of the microcomputer-managed sequenced course outline. Phase two consisted of evaluating (a) the efficiency of time management and (b) the completed sequenced course outlines developed by the subjects. Phase two utilized a class of senior agricultural education majors, a panel of curriculum experts, and a panel of computer experts. Characteristics of interest included in this study were attitudes of students and a panel of experts toward the microcomputer-managed sequenced course outline program, student attitudes toward microcomputers, comparison of the time required to complete the sequenced course outlines by the subjects who used and did not use the software program, comparison of the completed sequenced course outlines developed by the control group and the experimental group, and selected demographic information on the control and the experimental groups.
**Development of the Software Program**

The concept for a microcomputer program to assist vocational agriculture teachers in curriculum planning evolved from an interest in microcomputers and the availability of task lists developed by Yoder and McCracken (1975). The literature review indicated that there was little if any previous research that used a microcomputer to assist teachers in developing or planning a sequenced course outline or a curriculum. Many researchers (Gartin & Gartin, 1984; Hanson, 1984; Martin, 1984; and Moursund, 1983) called for the computerization of data bases to assist teachers in curriculum development.

A model (Appendix D) was developed by the researcher to illustrate several of the possible variables that influence the selection and sequencing of problem areas to be taught. Some of the possible variables that could influence the selection and sequencing of the problem areas were:

1. teacher variables (knowledge, goals and objectives, experience, etc.);

2. student variables (learning style, attitude, rate of learning, prior learning, etc.);

3. resource variables (equipment, resources, supplies and materials, text books, audio-visuals, etc.);
4. fixed variables (variables that will not change from one class to another, such as some problem areas would be precursors of other problem areas or some problem areas should be taught at a specific time during the school year, etc.);

5. miscellaneous variables (advisory committee, community needs, local administration, State Department of Education, etc.);

6. and interactions between the various variables, especially between the teacher and (a) the students, and (b) the miscellaneous variables.

The model (Appendix D) also lists some potential uses of a microcomputer-managed curriculum. The envisioned output for a microcomputer-managed curriculum is shown across the bottom of the model. Uses of the software program could include: lists of supplies, resources, and equipment for each problem area; sequenced course outline; sequenced problem areas; related mathematics, science, and communication skills; scope of each problem area; grouped tasks for laboratory activities; and related record keeping activities, such as tasks mastered by each student.

The researcher hired Mr. Ben Kovitz, a programmer, to further explore the possibilities of developing a software program. After studying several commercially available relational data base programs, Knowledgeman and R-base 5000,
and considering the advantages and disadvantages of each program, the researcher in consultation with Mr. Ben Kovitz and other computer programming experts, decided to write the microcomputer-managed sequenced course outline program in one of the currently available languages, BASIC, PASCAL or C. After considering the advantages and disadvantages of each of the programming languages, the decision was made to write the software program in C. Norton (1983) has suggested that for a software program to be long lived then one of the most important requirements is that the program be developed in a very "structured" (p. 72) way, to make the program much easier to debug, change, and improve. C and PASCAL are structured programming languages. "In general," stated Norton (1983) "the PASCAL and C languages are comparable, with a sparse, clean syntax, powerful expressiveness, and good structured logic facilities" (p. 73). Norton (1983) goes on to further emphasize that C is more powerful and has a more "rough-and-ready format" (p. 73) than PASCAL. Kernighan and Ritchie (1978) further suggest that an advantage of C is the independence of C to any particular machine architecture; that is, software programs written in C can be run with little or no modification on a variety of machines.

The researcher considered all identified variables that could influence the development of a microcomputer-managed
sequenced outline program, including: time, finances, programming knowledge, requirements by the Ohio Department of Education, and requirements of the instructor for the class, Instructional Program Planning for Vocational Agriculture class. Based on these variables, a more realistic model (Appendix E) was developed that showed what could be accomplished by a software program in developing a sequenced course outline. There is quite a disparity between the two models (Appendices D & E), that is, what potentially could be done and what actually was accomplished is very much in evidence when evaluating the two models.

The software program contained a data base for each of the taxonomies in agriculture (Appendix F, Screen 1). A data base consists of instructional titles (Appendix F, Screen 2), problem areas (Appendix F, Screen 3), and related tasks (Appendix F, Screen 4). A vocational agriculture teacher can add, delete, change, modify, and/or edit any of the information contained in a data base.

Once a vocational agriculture teacher has completed modifying a data base for a taxonomy, the teacher may elect to "move" problem areas to the edit screen (Appendix F, Screen 12) where the problem areas may be sequenced. Each problem area contains a related task list which may also be "edited" by "toggling" on and off the tasks to list in the report (Appendix F, Screens 18 & 19). The software program
will print several forms (Appendix F, Reports 1 & 2): a complete sequenced course outline (Appendix F, Report 2), which includes the instructional title, problem areas, and related tasks; a list of sequenced problem areas; and a list of problem areas or a course outline. Additional details regarding editing and reports can be found in the instruction manual (Appendix F).

The development of the microcomputer-managed sequenced course outline paralleled the software development process for projects of the intermediate size, 1,000 to 20,000 lines of source code and as described by Gordon and Renee Waite (1985).

1. The purposes of the proposed software program were written. The output reports and the program inputs were defined by content.

2. The experience level of the intended uses, the type of microcomputer, memory limitations, graphic requirements, and printer requirements were identified.

3. A report definition which includes three types of reports, printed reports, screen displays and reports written to disk. These definitions describe what will be in the reports and how the reports will look.
4. The data base files were defined. These definitions included:
   a. file names and descriptions;
   b. relationship between files;
   c. file types (ASCII, binary, fixed length, etc.);
   d. field names and descriptions;
   e. field definitions (string, integer, long, etc.);
   f. index definitions; and
   g. size estimates for all files.

5. The interface techniques used in the program were defined. Definitions included:
   a. function keys;
   b. menus (bar menus, single stroke menus, or multi-key menus);
   c. greetings, wait messages, and closings;
   d. general screen format, specifically, how will borders, color, and reverse video be used;
   e. error messages;
   f. use of specially defined keys, such as the space bar, enter key and other specially defined keys.

6. The informational, data entry screens, menus, and screen overlays were defined.
7. The general purpose and then the core input/output routines were written. The general purpose routines or system level routines included:
   a. screen generators;
   b. menu generators;
   c. screen display handlers;
   d. menu display handlers;
   e. data entry routines;
   f. library managers; and
   g. file handlers.

8. The software program was tested for performance. This testing was important for further debugging and modification of the program (Waite et al., 1985).

   The final step was to integrate all the routines or modules (Appendix G) into the main program. The written program (Appendix H) became the source code, which was little more than an ASCII text file (Purdum, 1985). The source code became the input file for the C compiler. The C compiler reads the source code and if there are no errors detected, will write an intermediate file call object code (Mix C, 1985), pseudocode or a relocatable format (Purdum, 1985). This intermediate file became a legal C program and must be joined or linked with all the other routines or modules. Thus, the intermediate files became the input
files for the linker. The linker takes all the information generated by the C compiler and "...link that information to form an executable C program" (p. 73).

Population

The population for the evaluation component of this study consisted of 15 students preparing to teach vocational agriculture and majoring in agricultural education, at The Ohio State University. They were also enrolled in Agricultural Education 585 (Instructional Program Planning for Vocational Agriculture) during Spring Quarter 1986.

A group of 24 undergraduate students, majoring in agricultural education, and a group of 10 senior students, majoring in agricultural education, enrolled in Agricultural Education 585 during Winter Quarter 1985, were used to pilot test the instruments and the microcomputer-managed sequenced course outline program.

Since random selection from the total population of senior agricultural education majors was not feasible, the target population was those students enrolled in Agricultural Education 585 during the Spring Quarter 1986. The subjects were randomly selected and assigned to the control and the experimental groups. The students who
enrolled in the course, Instructional Program Planning for Vocational Agriculture, during the study constituted the experimentally accessible population.

Since the subjects in the study were students enrolled in Agricultural Education 585, generalizations were made only to students who enroll in Agricultural Education 585, Instructional Program Planning for Vocational Agriculture, in the future or in similar classes at The Ohio State University.

Design

The design for the evaluation of the microcomputer-managed sequenced course outline was similar to the pretest posttest control group design described by Campbell and Stanley (1963).

\[
\begin{align*}
R_0 & \quad X_1 \quad O_2 \\
R_0 & \quad X_2 \quad O_4
\end{align*}
\]

These symbols are defined as:

- \(X\) represents the exposure of the groups to the treatment.
- \(X_1\) represents the exposure of the control group to the traditional method of developing a sequenced course outline.
- \(X_2\) represents the exposure of the experimental group to the experimental variable, microcomputer-managed sequenced course outline development.
O indicates measurements on the subjects.

\( O_1 \) and \( O_3 \) represents the pretests ("Attitude Toward Microcomputers" and GPA) administered at the beginning of the study.

\( O_2 \) represents the posttests ("Time Log" & "Vocational Agriculture Course Outline") that were completed by the control group at the conclusion of the study.

\( O_4 \) represents the posttests ("Time Log", "Vocational Agriculture Course Outline" & "Software Evaluation") that were completed by the experimental group at the conclusion of the study.

R represents the random selection from an intact group and assignment of the subjects to one of the two groups.

The reason the design for this study was not considered to be exactly the pretest posttest control group design as described by Campbell and Stanley (1963) was because enrollment in Agricultural Education 585 was self-selected by the subjects; however, the subjects were randomly selected and assigned to the two levels of the independent variable. One level of the independent variable was the development of a sequenced course outline via conventional means, namely sequenced course outlines are traditionally developed by students selecting and sequencing instructional titles, problem areas, and tasks that would be taught for a specific program. Such sequenced course outlines are developed by the students after reviewing references and other resource materials to obtain the necessary information, consisting of instructional titles, problem
areas, and related tasks. The students methodically select, arrange, and type the sequenced course outlines on a typewriter or a word processor.

The second level of the independent variable was developing a sequenced course outline using a microcomputer-managed sequenced course outline program. Microcomputer-managed sequenced course outline development utilizes a database containing suggested instructional titles, problem areas, and tasks which a teacher may select from to develop a sequenced course outline.

The active independent variable was the method by which the sequenced course outline was developed. The two levels of the independent variable were: (a) development of a sequenced course outline by traditional methods and (b) development of a sequenced course outline by a microcomputer-managed sequenced course outline program. The method by which the sequenced course outline was developed represented the only difference between the two levels in the study. In addition to the manipulated independent variable, the following attribute variables were measured: sex, age, training on microcomputers, experience in programming, experience with computer-assisted instruction, and typing experience.

The major dependent variable was time required for the completion of the assigned individual projects, Vocational
Agriculture Course Outline (Appendix I), for Agricultural Education 585. A time log recorded the time required for completion of the projects by the subjects. Additional dependent variables measured the attitude of the subjects toward the microcomputer-managed sequenced course outline program and the score received on the sequenced course outline projects completed by the students.

Antecedent measures included grade point averages and appropriate demographic information. The data were collected from both groups. A pretest, "Attitudes Toward Microcomputers", was also administered to both groups. The antecedent measures and the pretest were used to determine if the two groups were statistically equivalent before the treatment. The pretest was different from the posttest in order to avoid the possibility of the posttest scores being influenced by exposure of the students to the posttest as a pretest.

The study was conducted during the Spring Quarter of 1986. The experimental group and the control group were taught by the same instructor. Both groups followed the same course outline (Appendix J) and had similar opportunities to participate in class learning experiences. The only difference was that the treatment group used the microcomputer-managed sequenced course outline program while the control group developed their sequenced course outline
by traditional methods. Both groups had identical projects (Appendix I), developing a sequenced course outline. The projects were scored by a panel of experts in program planning to determine if the projects completed by the two groups were equivalent. All subjects were requested to keep an accurate record of the time required to complete their projects. Only the treatment group was required to complete the Software Evaluation posttest.

Eight threats to the internal validity of quasi-experimental research were identified by Campbell and Stanley (1963): history, maturation, testing, instrumentation, regression, selection, mortality, and interaction of selection and maturation. An analysis of each of these threats and an explanation of how each was minimized by the researcher follows.

History (events occurring between the pretest and the posttest, other than the microcomputer-managed sequenced course outline program) is a threat in that the performance of one group might be caused by an event that only one group experienced, rather than being caused by the use of the software program. Since there was a control group and since both groups were exposed to the same events in the classroom, except for the different levels of the independent variable, intrasession history was controlled as a threat. Both groups were part of the same class,
receiving the same instruction and the same project assignments and therefore should have experienced no difference in intrasession history.

Maturation was not considered a threat to the internal validity of this study because the length of the study and the measurements were taken within a four week span. The subjects were all senior agricultural education majors and maturation affecting the dependent variables would not be expected to occur or would be expected to be manifested equally in experimental and control groups and unlikely to influence the results of this study.

Testing was not considered a threat to the internal validity of this study. The design controlled this threat in that any testing involved both the experimental and the control group, thus testing should have been manifested equally in experimental and control groups.

Instrumentation was not considered a threat to the internal validity of this study. There were no changes made in the calibration of a measuring instrument or other changes that would produce changes in the obtained measurement. Since the conditions for controlling intrasession history as a threat to the internal validity were met, instrumentation as a threat to the internal validity was also controlled.
Statistical regression could be considered a threat to this study since the subjects self-selected enrollment in Agricultural Education 585. However, the subjects were randomly selected and assigned from the same pool to the control and experimental groups. Since both groups were statistically equivalent in terms of grade point average and previous experience at the beginning of the study, the control group should regress as much as the experimental group. Therefore, there was no reason to suspect that statistical regression was a threat to the validity of this study.

Selection was considered a threat to this study because the subjects self-selected participation by their enrollment in Agricultural Education 585. However, because the subjects were randomly selected and assigned from the same pool to the control and the experimental groups, the threat to selection was reduced. Simple random assignment assures an unbiased assignment of subjects to the control and experimental groups; however, the equivalence of the two groups may be questioned since the assurance of equality is greater for large numbers of random assignments than for small numbers of random assignments. Cumulative grade point averages and demographic data of the groups were compared to determine if the groups were statistically equivalent at the beginning of the study. The students were not assigned to
either group until the third class session. Thus no subjects could possibly select themselves into a group because of the treatment given. Although no students dropped the course, they could drop the course as is possible in any university course; however, the students were not allowed to change groups.

Mortality was not considered a threat to this study due to the nature of the study. All students who were present for the pretest were also present for the posttest(s).

The interaction between selection and maturation, and so forth was the last threat to internal validity as presented by Campbell and Stanley (1963) and was not considered a threat due to the length and nature of the study. Since the study was of such a short duration, the interaction between selection and maturation, and so forth was minimized.

There were four possible threats to external validity listed by Campbell and Stanley (1963) for this type of research: interaction of testing and treatment, interaction of selection and treatment, reactive arrangements, and multiple treatment interference. The first threat to external validity, interaction of testing and treatment, addresses the issue of whether the findings of this study can be generalized to populations that have not been pretested. The findings of this study cannot be generalized
to a population that has not been pretested; however, since this study was conducted in a university setting where tests and pretests are not uncommon, then the risk of generalizing to a group of senior agricultural education majors enrolled in a program planning class where a pretest is not administered was not as great a threat to external validity as administering a pretest might appear.

The interaction of selection and treatment was the second threat to the external validity of this design. Because the students were not randomly selected for participation in the study but self-selected to enroll in Agricultural Education 585, Instructional Program Planning for Vocational Agriculture, the distinct possibility existed that the interaction of selection and treatment produced results that would be different from those that would be found by the use of a random sample. Although the researcher did not view selection to be a serious threat to this study, caution should be exercised in generalizing the results of this study to students who enroll in similar courses in the future.

Although reactive arrangements may possibly have been a threat to the external validity of this design, the possibility was quite remote. The subjects were informed by the instructor and the researcher that they were going to develop their sequenced course outlines by different
methods. The possibility existed for the students to deduce that an experiment was being conducted. However, since the subjects could not be kept ignorant of the experiment due to the nature of the experiment, the researcher and the instructor attempted to make the subjects of the two groups feel equally singled out. If the students in both groups felt that they were being singled out, then the subjects of the two groups should have been equally motivated (Van Dalen, 1973). One concern was that the students might discuss the length of time required to complete the assigned projects; however, a pilot study during the Winter Quarter, 1985 indicated no such problems, nor were any difficulties noticed during this. Thus, there appeared to be few if any confounding variables because of student interaction and adverse reaction between the two groups. The nature of the experiment, the use of a computer-managed sequenced course outline program, minimized reactive arrangements as an external validity threat.

The last threat to external validity, multiple treatment interference, was not a threat to external validity because there was only one treatment involved.

The findings of this study can be generalized to students who enroll in Agricultural Education 585, Instructional Program Planning for Vocational Agriculture, at The Ohio State University. Even though the experiment
was not duplicated, all the work, including the pilot test, was conducted with senior agricultural education majors at The Ohio State University and hence the researcher would not feel confident in generalizing to any other group of students.

Data and Instrumentation

Seven instruments were used in this study: "Attitude Toward Microcomputers," "Software Evaluation," "Time Log," "Demographic Characteristics," "Computer Background Characteristics," "Vocational Agriculture Course Outline," and "Vocational Agriculture Course Outline Score Sheet". Six of the instruments were developed by the researcher and and one by the instructor for Agricultural Education 585, Instructional Program Planning for Vocational Agriculture.

Attitude toward microcomputers. The researcher developed an instrument to assess attitudes toward microcomputers (Appendix K). Previous instruments developed by Bowen and Agnew (1984) and Cantrel (1982) were used as a basis to develop an instrument with more items. The instrument contained both positive and negative statements pertaining to microcomputers. Content validity was established by a panel of selected faculty members in Agricultural Education at The Ohio State University, an instructional design expert employed by industry, and
graduate students in agricultural education at The Ohio State University, with experience in microcomputers. The panel members were asked to react to the items that were identified by the researcher to determine attitudes toward microcomputers. If a majority of the reviewers agreed to the usefulness of an item in determining attitudes toward microcomputers, the item was placed on the instrument. The instrument was pilot tested by 10 senior agricultural education students enrolled in a program planning class, none of whom were included in the study.

Respondents were asked to respond to a 6 point Likert-type scale from "very strongly disagree" (1) to "very strongly agree" (6). The scores of individual students were derived by totaling the responses to the thirty-two items and dividing by the number of items to derive a mean attitudinal score for each student. The mean score represented attitudes of students toward microcomputers. Overall mean scores for the two groups were computed using individual mean scores of all individuals in the group.

Reliability was determined by the use of the Cronbach's Alpha procedure on two groups which were used to pilot test the instrument. One group was 24 undergraduate agricultural education majors and the second group was 10 senior agricultural education students. The results are reported in Table 1.
Table 1

Reliability Coefficient of Instrument: Attitude Toward Microcomputers

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate Students</td>
<td>24</td>
<td>0.82</td>
</tr>
<tr>
<td>Senior Students</td>
<td>10</td>
<td>0.86</td>
</tr>
</tbody>
</table>

Software evaluation. The researcher developed an instrument to assess attitudes toward the software program, microcomputer-managed sequenced course outline (Appendix L). The researcher used previous instruments developed by Chase, Gordon, and Makin (1984); and DeBloois (1982) as a basis for developing the major areas (quality, value, design considerations, video quality, content, and summary) of interest in evaluation of the microcomputer-managed sequenced course outline program.

Respondents were asked to respond to a 6 point Likert-type scale from "very strongly disagree" (1) to "very strongly agree" (6). There were both positive and negative statements pertaining to each major area (quality, value, design considerations, video quality, content, and summary)
of the instrument. The scores of subjects were derived by totaling the responses to the items and dividing by the total number of items. The mean score represents attitudes of the experimental group towards the software program.

Content validity of the statements was established by a panel of faculty members in Agricultural Education at The Ohio State University, an instructional design expert, and graduate students in agricultural education at The Ohio State University. The instrument was pilot tested Winter Quarter of 1985 with 10 senior agricultural education majors, enrolled in Agricultural Education 585, Instructional Program Planning for Vocational Agriculture.

Internal consistency was determined by the use of the Cronbach's Alpha procedure with the pilot test group. The results are reported in Table 2.

Table 2

<table>
<thead>
<tr>
<th>Reliability Coefficient of Instrument: Software Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>Senior Students</td>
</tr>
</tbody>
</table>
The instrument, "Software Evaluation," was also used by a panel composed of an Agricultural Education faculty member, a recent graduate (Doctor of Philosophy) in Agricultural Education, and a research specialist from The National Center for Research in Vocational Education to evaluate the software program. The inter-rater reliability was determined by a version of Kuder-Richardson formula 20 (Ebel, 1979). The results are reported in Table 3.

Table 3
Inter-rater Reliability Coefficient of Instrument: Software Evaluation

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel</td>
<td>3</td>
<td>0.79</td>
</tr>
</tbody>
</table>

Time requirements. (Appendix M) This instrument consisted of a record of the time required by each of the students to develop the sequenced course outlines. The instrument was reviewed by a panel of faculty members and graduate students in agricultural education. As a result of this review, two separate examples (Appendix N) of how to record the time spent on the sequenced course outline
assignment were developed. The instrument, "Time Log," was pilot tested Winter Quarter of 1985 by a group of 10 senior agricultural education majors, enrolled in Agricultural Education 585, and changes indicated by the pilot study were incorporated in the final revision of the instrument.

Background information and computer background. The final two instruments (Appendices O & P) were adapted by the researcher from previous instruments developed by Instruction and Research Computer Center ("Computing education needs," 1985) and Chase and others (1984). The instruments were reviewed by a panel including faculty members, an instructional designer, and graduate students in agricultural education for content validity.

Additional demographic data, including grade point average and class rank were collected by the researcher from existing records.

Vocational agriculture course outline. The instrument was the completed class assignment, a sequenced agricultural course outline (Appendix Q). The class assignment (Appendix I) specified that the students should identify the major instructional units, problem areas, and tasks that the students intended to teach for their specific taxonomy. To avoid bias by the instructor, a panel of experts evaluated the projects, "Vocational Agriculture Course Outline", which were completed by the subjects. The score received on the
posttest ("Vocational Agriculture Course Outline") represents a measure (dependent variable) which reflected the effect of the treatment (traditional course outline development or computer-managed course outline development) on the subjects.

**Vocational agriculture course outline score sheets.**
The researcher developed an instrument to score the completed sequenced course outline projects (Appendix R). Content validity of the instrument was established by the researcher and a panel of faculty members at The Ohio State University. Two variables (content and format) were identified which should be evaluated on the completed sequenced course outlines. Each variable contained five statements that were each scored by a panel of experts using a 100 point scale. The statements contained in each variable were weighted because the statements were not considered by the researcher to be of equal importance. Weights were assigned in proportion to the relative importance (Lynch & Huntsberger, 1976) of each statement by a separate panel of experts. A panel of experts weighted each statement so that each of the variables (content and format) contained a total of 100 points (Appendix S). The data were analyzed using a t-test to compare the means of the control group and the experimental group on each of the variables content and format, the total combined score
(content plus format), the weighted variables content and format, and the total weighted score (weighted variables content and foramt). The t-tests for weighted statement means were not calculated since weighting is a linear transformation (Lynch & Huntsberger, 1976).

The inter-rater reliability was determined by using a version of the Kuder-Richardson formula 20 (Ebel, 1979, pp. 282-284). Results for each statement, the two areas of content and format, and the total score were calculated. The results are reported in Table 4.
Table 4

Inter-rater Reliability Coefficients of Instrument:
Vocational Agriculture Course Outline Score Sheet

<table>
<thead>
<tr>
<th>Question</th>
<th>n</th>
<th>K-R 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>.68</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>.56</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>.26</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>.45</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>.15</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>.89</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>.54</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>.75</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>.84</td>
</tr>
<tr>
<td>10</td>
<td>3</td>
<td>-.68</td>
</tr>
<tr>
<td>Content (1 - 5)</td>
<td>3</td>
<td>.44</td>
</tr>
<tr>
<td>Format (6 - 10)</td>
<td>3</td>
<td>.84</td>
</tr>
<tr>
<td>Total (1 - 10)</td>
<td>3</td>
<td>.84</td>
</tr>
</tbody>
</table>
Data Collection

Subjects enrolled in Agricultural Education 585, Instructional Program Planning for Vocational Agriculture, Spring Quarter of 1986 were randomly selected and assigned to one of two groups, traditional course outline development or computer-managed sequenced course outline development. The subjects in both groups were given the "Attitude Toward Microcomputers," "Computer Background" and "Background Information" (Appendices K, P, & O) instruments. The subjects were given the instruments during the fifth class session prior to being given the Vocational Agriculture Course Outline Assignment (Appendix I). The subjects were identified by their Social Security number on all instruments used in the study.

In order not to bias the control group or the experimental group, the two groups were presented separate verbal suggestions regarding the process by which the class project, "Vocational agriculture course outline," should be completed. The following outline lists the verbal suggestions that were presented to the experimental group.
I. Selection

(a) Review a list of major instructional topics for your taxonomy area, for example, crop production, livestock production personal development or supervised occupational experience. A list of instructional topics could be found in the proficiency record books of occupational tasks distributed by the Ohio Agricultural Education Curriculum Materials Service, The Ohio State University.

(b) Select a specific instructional topic.

(c) Review the list of problem areas which are associated with a specific instructional topic.

(d) For a specific instructional unit, select the specific problem areas which are to be included in the vocational agriculture curriculum, such as:

Feeding Livestock

- define the parts of the livestock digestive system
- Identify nutritive requirements
- select feeds
- develop rations
(e) For a specific problem area, select the skills which are to be included in the vocational agriculture curriculum.

(f) Repeat the above procedure for each problem area and for each instructional topic.

(g) Obtain a printout of the total vocational agriculture curriculum.

(h) Refer to the example in program to guide your work.

II. Sequence

(a) Review the printout of your total vocational agriculture curriculum.

(b) For each major instructional unit, select the problem areas that you plan to teach in Vocational Agriculture I. You should plan to select between 20 - 22 problem areas per year.

(c) Repeat the above procedure for Vocational Agriculture II, III and IV.

(d) Obtain a printout of the problem areas for the four-year vocational agriculture program.

(e) Review the list of problem areas for Vocational Agriculture I.
(f) Place the problem areas in the order they will be taught during the school year (For instance, the first problem area chosen by you to teach in August is "Becoming Established in Agriculture Careers" and the last problem area chosen by you to teach in late May/early June is "Maintaining and Repairing Farm Machinery").

(g) Obtain a printout of your sequenced list of problem areas for Vocational Agriculture I.

(h) Place the problem areas into a 38-week sequence. Remember to add in dates for holidays, contests, meetings and so forth.

(i) Repeat the above procedure for Vocational Agriculture II, III, and IV (Henderson & Powell, 1985).

The "Time Log" (Appendix M) was used by the subjects to keep an accurate record of the time required to complete the various phases of the assignment. Each group was given a specific example (Appendix N) of how the instrument was to be completed by the subjects. Two different examples of the "Time Log" were used so as not to bias either group.

The "Vocational Agriculture Course Outlines" were completed and turned in to the instructor during the
eleventh and the twelfth class sessions, four weeks after beginning the study. The instruments were photocopied by the researcher to be evaluated later by a panel of curriculum experts.

The "Software Evaluation" (Appendix L) instrument was given to the experimental group prior to the subjects receiving feedback from the course instructor on their completed assignments ("Vocational Agriculture Course Outline").

Data Analysis

This study was designed to be an experimental study of a developmental nature with research objectives being analyzed using the Statistical Package for the Social Sciences (SPSSX, version 2.1 and SPSS/PC+, version 1.1). The a priori alpha level was established at the .05 level.

Research objective one was to develop a sequenced course outline software program that would meet the minimum requirements of Agricultural Education 585, Instructional Program Planning for Vocational Agriculture. The software program was planned and developed by the researcher. In association with a programmer, the computer-managed sequenced outline program was written and compiled in C.

Research objective two determined the utility of the microcomputer-managed sequenced course outline program by
the preservice vocational agriculture teachers and a review panel of computer literate experts. The panel of computer experts consisted of a faculty member from The Ohio State University and two computer experts from the National Center for Research in Vocational Education. A summated Likert-type scale was used to determine a mean for the preservice agricultural teachers who used the software program and the review panel of computer experts.

The third research objective addressed the time required by the subjects to complete their sequenced course outline assignments. The control group completed the sequenced course outlines by traditional methods and the experimental group used the computer-managed sequenced course outline. The data were analyzed using a t-test to compare the means of the two groups.

Research objective four assessed the completed sequenced course outlines ("Vocational Agriculture Course Outline") by a panel of curriculum experts. The panel of curriculum experts consisted of two faculty members at The Ohio State University and a State Agricultural Supervisor at the Ohio Department of Education. The scores and the weighted scores for the two major variables on the "Vocational Agriculture Course Outline Score Sheets" (Appendix S) were analyzed using a t-test to compare the means of the control group and the experimental group.
Research objective five described the attitudes of the preservice vocational agriculture teachers toward microcomputers by the control group and the experimental group. A summated Likert-type scale was used to determine means for the two groups. A t-test was used to compare the means of the control and the experimental groups.

Research objective six determined the number of problem areas sequenced per year by the subjects. The mean number of problem areas sequenced per year were determined for each student. A t-test was used to compare the means of the control and the experimental groups.
CHAPTER IV

Findings

Introduction

This study was accomplished in two phases. The first phase of this study, objective one, was to determine if a software program could be developed for a microcomputer that would assist preservice vocational agriculture teachers to sequence a course outline by meeting the minimum requirements of Agricultural Education 585 (Instructional Program Planning for Vocational Agriculture). The second phase of this study consisted of five research objectives. The second research objective of this study was to determine the utility of the software program as perceived by the preservice vocational agriculture teachers who used the software program and as perceived by a panel of experts (Appendix S). The third research objective was to determine if the microcomputer-managed sequenced course outline program would significantly reduce the amount of time required to complete the assigned project (Appendix I) for the program planning class, Agricultural Education 585. Research objective four was to determine if the projects
completed by students who used the microcomputer-managed sequenced course outline program and the projects completed by the control group using traditional methods were similarly scored by a panel of experts. The attitudes of the preservice vocational agriculture teachers were determined by research objective five. The average number of problem areas sequenced per year by the preservice vocational agriculture teachers in this study were determined by research objective six.

Descriptive statistics were employed to analyze the data and to describe each group on demographic, computer background and computer evaluation variables of interest. A t-test analysis was used to determine if significant differences existed between the control group and the experimental group on demographic variables, computer background variables, attitude toward computers, scores on the final projects, time to develop a sequenced course outline, and the number of problem areas sequenced.
Description of the Population

The subjects of the study were students enrolled in Agricultural Education 585, Instructional Program Planning for Vocational Agriculture, Spring Quarter, 1986 at The Ohio State University. All of the subjects were seniors majoring in agricultural education.

Table 5 indicates how the control group and the experimental group compared on the demographic variable age of the subjects. The control group had a mean age of 21.7 and the experimental group had a mean age of 21.9.

Table 5
Age of Subjects by Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>3</td>
<td>42.9</td>
<td>3</td>
</tr>
<tr>
<td>22</td>
<td>3</td>
<td>42.9</td>
<td>3</td>
</tr>
<tr>
<td>23</td>
<td>1</td>
<td>14.3</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100</td>
<td>8</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Although gender was not a variable considered to be a factor in this study, Table 6 indicates that nearly 57% of the control group was female. There were no females in the experimental group.

Table 6
Gender of the Study Participants by Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f  %</td>
<td>f  %</td>
<td>f  %</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>4  57.1</td>
<td>-  0.0</td>
<td>4  27</td>
</tr>
<tr>
<td>Male</td>
<td>3  42.9</td>
<td>8  100</td>
<td>11  73</td>
</tr>
<tr>
<td>Total</td>
<td>7  100</td>
<td>8  100</td>
<td>15  100</td>
</tr>
</tbody>
</table>
Table 7 compares the control group and the experimental group on college grade point average (GPA). The control group had a mean GPA of 2.54 out of a possible 4.0. The experimental group had a mean GPA of 2.55.

Table 7

Grade Point Averages in College by Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
</tr>
<tr>
<td>GPA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 2.00</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
</tr>
<tr>
<td>2.00 - 2.49</td>
<td>3</td>
<td>42.9</td>
<td>4</td>
</tr>
<tr>
<td>2.50 - 2.99</td>
<td>3</td>
<td>42.9</td>
<td>4</td>
</tr>
<tr>
<td>3.00 - 3.49</td>
<td>1</td>
<td>14.2</td>
<td>-</td>
</tr>
<tr>
<td>3.50 - 3.99</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100</td>
<td>8</td>
</tr>
<tr>
<td>Mean</td>
<td>2.54</td>
<td></td>
<td>2.55</td>
</tr>
</tbody>
</table>
The groups were compared on their experience with microcomputers as indicated in Table 8. The subjects responded to the "Computer Background" instrument (Appendix P) as to their computer experience. The computer experience was converted to scores using a predetermined scale. The scale used was one, non-user; two, beginner; three, intermediate; and four, advanced. The control group had a grand mean 2.49 for computer experience with a possible score of 4.00. The experimental group had a mean computer experience of 2.50.

Table 8

Computer Experience by Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
</tr>
<tr>
<td>Computer Experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-user (1)</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
</tr>
<tr>
<td>Beginner (2)</td>
<td>3</td>
<td>42.9</td>
<td>4</td>
</tr>
<tr>
<td>Intermediate (3)</td>
<td>4</td>
<td>57.1</td>
<td>4</td>
</tr>
<tr>
<td>Advanced (4)</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100</td>
<td>8</td>
</tr>
<tr>
<td>Mean</td>
<td>2.49</td>
<td></td>
<td>2.50</td>
</tr>
</tbody>
</table>
Table 9 shows the previous typing experience of the two groups. Students responded to the "Background" instrument (Appendix 0) as to their typing experience. The typing experience was converted to scores using a predetermined scale. The scale used was one, poor; two, fair; three, good; and four, very good. The control group had an overall mean score of 3.00 for previous typing experience out of a possible score of 4.00. The experimental group had a previous typing experience score of 2.63.

Table 9

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Group</th>
<th></th>
<th>Experimental Group</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
<td>%</td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Typing Experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor (1)</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>0.0</td>
</tr>
<tr>
<td>Fair (2)</td>
<td>1</td>
<td>14.3</td>
<td>3</td>
<td>37.5</td>
<td>4</td>
<td>26.7</td>
</tr>
<tr>
<td>Good (3)</td>
<td>5</td>
<td>71.4</td>
<td>5</td>
<td>62.5</td>
<td>10</td>
<td>66.7</td>
</tr>
<tr>
<td>Very Good (4)</td>
<td>1</td>
<td>14.3</td>
<td>-</td>
<td>0.0</td>
<td>1</td>
<td>6.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>7</td>
<td>100</td>
<td>8</td>
<td>100</td>
<td>15</td>
<td>100</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>3.00</td>
<td></td>
<td>2.63</td>
<td></td>
<td>2.80</td>
<td></td>
</tr>
</tbody>
</table>
The two groups were compared on their current computer use and training on a microcomputer (Table 10). The students responded to the "Computer Background" instrument (Appendix P) as to whether they were currently using a microcomputer. Almost 75% of the experimental group was currently using a microcomputer. The control group had 57% not currently using a microcomputer. Fourteen of the subjects had completed a computer course for college credit. None of the subjects in either group had taken a high school microcomputer course.
Table 10

Current Computer Use and Computer Training by Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
</tr>
<tr>
<td>Current Computer Use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
<td>42.9</td>
<td>6</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>57.1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>100</td>
<td>8</td>
</tr>
<tr>
<td>Computer Training</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>6</td>
<td>85.7</td>
<td>8</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>14.3</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>100</td>
<td>8</td>
</tr>
</tbody>
</table>
In order to determine if the control group and the experimental group were statistically equivalent, the two groups were compared on several demographic variables. T-test comparisons between the two groups for the variables age, gender, GPA, computer experience, typing experience, computer use and computer training are reported in Table 11. The two groups were not statistically different on any of these variables except gender. The t-test comparison between the control group and the experimental group for the variable gender was significant at the .05 level (t-test value of -3.04, Table 11).
Table 11  
Comparison of Control Group and Experimental Group on  
Demographic Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Number of Cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Control</td>
<td>7</td>
<td>21.7</td>
<td>.756</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>21.9</td>
<td>.835</td>
<td>0.39</td>
<td>.704</td>
</tr>
<tr>
<td>Gender</td>
<td>Control</td>
<td>7</td>
<td>1.43</td>
<td>.535</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>2.00</td>
<td>.000</td>
<td>-3.04*</td>
<td>.007</td>
</tr>
<tr>
<td>GPA</td>
<td>Control</td>
<td>7</td>
<td>2.54</td>
<td>.376</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>2.55</td>
<td>.276</td>
<td>0.03</td>
<td>.978</td>
</tr>
<tr>
<td>Computer Experience</td>
<td>Control</td>
<td>7</td>
<td>2.43</td>
<td>.535</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>2.50</td>
<td>.535</td>
<td>0.26</td>
<td>.800</td>
</tr>
<tr>
<td>Typing Experience</td>
<td>Control</td>
<td>7</td>
<td>3.00</td>
<td>.577</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>2.63</td>
<td>.518</td>
<td>-1.33</td>
<td>.207</td>
</tr>
<tr>
<td>Computer Use</td>
<td>Control</td>
<td>7</td>
<td>1.43</td>
<td>.535</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>1.75</td>
<td>.463</td>
<td>1.25</td>
<td>.234</td>
</tr>
<tr>
<td>Computer Training</td>
<td>Control</td>
<td>7</td>
<td>1.86</td>
<td>.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>2.00</td>
<td>.000</td>
<td>-1.08</td>
<td>.234</td>
</tr>
</tbody>
</table>

Note. df=1,13.

*a-t-test value was calculated by hand.

*p<.05.
Findings for the Research Objectives

Research objective one. Develop a sequenced course outline program that would meet the minimum requirements of Agricultural Education 585, Instructional Program Planning for Vocational Agriculture. The planning and development of the executable C program (Appendices G & H) was accomplished by the researcher and was programmed by Mr. Ben Kovitz. The program is the property of the researcher. The software program has been reviewed by the dissertation committee and by a panel of computer experts. The data presented regarding objectives two through six further indicate that objective one was satisfied.

Research objective two. Determine the utility of the software program as perceived by the preservice teachers who used the microcomputer-managed sequenced course outline program and as perceived by a review team of microcomputer experts.

The perceived utility of the software program was determined by the "Software Evaluation" instrument (Tables 12 and 13). The instrument contained areas of quality and value, design considerations, video, and content. Respondents were asked to score each statement on the instrument an one, "very strongly disagree"; a two, "strongly disagree"; a three, "disagree"; a four, "agree"; a five, "strongly agree"; or a six, "very strongly agree."
The data indicated the experimental group agreed that the software program had utility with a mean score of 3.96 on the summated Likert-type scale. Approximately 88% of the experimental group had scores of 4.00 (Table 12). All of the panel of computer experts recorded scores of 4.00 or above on the summated Likert-type scale. The panel of computer experts strongly agreed that the software program had utility with a mean score of 4.61.

The mean scores for each statement on the "Software Evaluation" instrument for the preservice vocational agriculture teachers and the panel of experts are in Appendix S.
Table 12
Perceived Utility of the Software Program by the Experimental Group and the Panel of Experts

<table>
<thead>
<tr>
<th>Mean Scores on &quot;Software Evaluation&quot;</th>
<th>Experimental Group</th>
<th>Faculty Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>&lt; 2.4</td>
<td>-</td>
<td>0.0</td>
</tr>
<tr>
<td>2.5 - 3.4</td>
<td>1</td>
<td>12.5</td>
</tr>
<tr>
<td>3.5 - 4.4</td>
<td>7</td>
<td>87.5</td>
</tr>
<tr>
<td>4.5 - 5.4</td>
<td>-</td>
<td>0.0</td>
</tr>
<tr>
<td>&gt; 5.5</td>
<td>-</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td>Mean</td>
<td>3.96</td>
<td>4.61</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.357</td>
<td>0.176</td>
</tr>
</tbody>
</table>

Note. Range of scores possible: one, "very strongly disagree"; two, "strongly disagree"; three, "disagree"; four, "agree"; five, "strongly agree"; and six, "very strongly agree."

Research objective three. Determine the amount of time required to complete the class assignment by traditional methods as compared to the time required to complete the class assignment using the software program.
The data reported in Table 13 show the mode for planning time was 3.80 hours for the control group. The mode was 1.00 hours for the experimental group. The mean number of hours to plan a sequenced course outline was 3.97 hours for the control group and 2.83 hours for the experimental group. The control group required slightly more planning time to develop a sequenced course outline but the two groups were not significantly different at the .05 level (t-test value of -1.27, Table 14).

Table 13
Planning Time to Develop a Sequenced Course Outline

<table>
<thead>
<tr>
<th></th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=7</td>
<td>n=8</td>
<td>N=15</td>
</tr>
<tr>
<td>Range</td>
<td>5.00</td>
<td>5.00</td>
<td>5.50</td>
</tr>
<tr>
<td>Mode</td>
<td>3.80</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Median</td>
<td>3.80</td>
<td>2.25</td>
<td>3.70</td>
</tr>
<tr>
<td>Mean</td>
<td>3.97</td>
<td>2.83</td>
<td>3.36</td>
</tr>
</tbody>
</table>
Table 14

Comparison of Planning Time to Develop a Sequenced Course Outline for Control and Experimental Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>3.97</td>
<td>1.84</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>2.83</td>
<td>1.63</td>
<td>-1.27</td>
</tr>
</tbody>
</table>

Note. p=.226, df=1,13.

Table 15 contains ranges, modes, medians, and means of typing time and computer entry time to prepare a sequenced course outline. The mean for the control group and the experimental group were 4.40 hours and 2.95 hours respectively.
Table 15

Typing Time and Computer Entry Time to Prepare a Sequenced Course Outline

<table>
<thead>
<tr>
<th></th>
<th>Control Group n=7</th>
<th>Experimental Group n=8</th>
<th>Total N=15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>5.00</td>
<td>2.50</td>
<td>5.00</td>
</tr>
<tr>
<td>Mode</td>
<td>2.00</td>
<td>2.50</td>
<td>2.00</td>
</tr>
<tr>
<td>Median</td>
<td>5.30</td>
<td>2.80</td>
<td>2.80</td>
</tr>
<tr>
<td>Mean</td>
<td>4.40</td>
<td>2.95</td>
<td>3.63</td>
</tr>
</tbody>
</table>

Table 16 shows the comparison of typing time and computer entry time to prepare a sequenced course outline for the control group and the experimental group. The control group required slightly more typing time to prepare a sequenced course outline than the experimental group, but the two groups were not significantly different at the .05 level (t-test value of -1.68, Table 16).
Table 16

Comparison of Typing Time and Computer Entry Time to Prepare a Sequenced Course Outline for Control and Experimental Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>4.40</td>
<td>2.17</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>2.95</td>
<td>0.76</td>
<td>-1.68</td>
</tr>
</tbody>
</table>

Note.  \( p=.136, \text{ df}=1,13. \)

The total time to plan and prepare a sequenced course outline is presented in Table 17. The mean time to plan and prepare a sequenced course outline for the control and the experimental groups were 8.37 hours and 5.78 hours respectively.
Table 17

**Total Time to Plan and Develop a Sequenced Course Outline**

<table>
<thead>
<tr>
<th></th>
<th>Control Group n=7</th>
<th>Experimental Group n=8</th>
<th>Total N=15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>6.70</td>
<td>4.00</td>
<td>8.50</td>
</tr>
<tr>
<td>Mode</td>
<td>5.80</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Median</td>
<td>8.00</td>
<td>5.75</td>
<td>6.50</td>
</tr>
<tr>
<td>Mean</td>
<td>8.37</td>
<td>5.78</td>
<td>6.99</td>
</tr>
</tbody>
</table>

There was not a significant difference in total time required to plan and prepare a sequenced course outline between the control group and the experimental group at the .05 level as indicated by the t-test value of -2.15 (Table 18).
Table 18

Comparison of Total Time to Develop a Sequenced Course Outline for Control and Experimental Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>8.37</td>
<td>2.84</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>5.78</td>
<td>1.58</td>
<td>-2.15</td>
</tr>
</tbody>
</table>

Note. p=.060, df=1,13.

Table 19 reveals the number of years for which the course outlines were sequenced by the control group and the experimental group. The subjects sequenced a course outline for one, two, or four years. The control group had approximately 43% of subjects which sequenced a course outline for four years. The experimental group had 75% of subjects which sequenced a course outline for four years.
Table 19

Number of Years Which Were Sequenced by the Two Groups

<table>
<thead>
<tr>
<th>Number of Years</th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>14.2</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>42.9</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>42.9</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100</td>
<td>8</td>
</tr>
</tbody>
</table>

Mean 2.71 3.38 3.07

The mean number of years which were sequenced by the control group and the experimental were 2.71 years and 3.38 years respectively. The experimental group sequenced a course outline for slightly more years but the two groups were not significantly different at the .05 level (t-test value of 1.04, Table 20).
Table 20

Comparison of the Mean Number of Years Which Were Sequenced by the Control Group and the Experimental Group

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>2.71</td>
<td>1.25</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>3.38</td>
<td>1.19</td>
<td>1.04</td>
</tr>
</tbody>
</table>

Note. p=.316, df=1,13.

Weighted times were calculated for planning time and typing or computer entry time by dividing the respective time (hours) for each subject by the number of years for which the subjects sequenced their course outline. Table 21 indicates the means for the weighted planning time to develop a sequenced course outline. The means for the control and the experimental group were 1.71 hours and .97 hours respectively.
Table 21

Weighted Planning Time (hours) to Develop a Sequenced Course Outline

<table>
<thead>
<tr>
<th></th>
<th>Control Group n=7</th>
<th>Experimental Group n=8</th>
<th>Total N=15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>2.95</td>
<td>1.75</td>
<td>3.45</td>
</tr>
<tr>
<td>Mode</td>
<td>.750</td>
<td>.25</td>
<td>.25</td>
</tr>
<tr>
<td>Median</td>
<td>1.63</td>
<td>1.08</td>
<td>1.25</td>
</tr>
<tr>
<td>Mean</td>
<td>1.71</td>
<td>.97</td>
<td>1.32</td>
</tr>
</tbody>
</table>

The control group had a slightly higher mean for the weighted planning time but the two groups were not significantly different at the .05 level, as indicated by the t-test value of -1.69 (Table 22).
Table 22

Comparison of Weighted Planning Time to Develop a Sequenced Course Outline for the Control and Experimental Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>1.71</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>.97</td>
<td>.64</td>
<td>-1.69</td>
</tr>
</tbody>
</table>

Note. p=.122, df=1,13.

The data summarized in Table 23 report the range, mode, median, and mean for the weighted typing time and the computer entry time to prepare a sequenced course outline for the two groups. The mean for weighted typing time was 1.74 hours for the control group and 1.24 hours for the experimental group.
Table 23

Weighted Typing Time and Computer Entry Time to Prepare a Sequenced Course Outline for the Control and the Experimental Groups

<table>
<thead>
<tr>
<th></th>
<th>Control Group n=7</th>
<th>Experimental Group n=8</th>
<th>Total N=15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>2.25</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Mode</td>
<td>1.00</td>
<td>0.70</td>
<td>0.70</td>
</tr>
<tr>
<td>Median</td>
<td>1.38</td>
<td>0.725</td>
<td>1.00</td>
</tr>
<tr>
<td>Mean</td>
<td>1.74</td>
<td>1.24</td>
<td>1.47</td>
</tr>
</tbody>
</table>

The mean number of hours to type a sequenced course outline was 1.74 hours for the control group and 1.24 hours for the experimental group. Table 24 shows a t-test value of -0.86 which indicated no significant difference between the two groups at the .05 level.
Table 24

**Comparison of Weighted Typing Time and Computer Entry Time to Prepare a Sequenced Course Outline for Control and Experimental Groups**

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>1.74</td>
<td>0.84</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>1.24</td>
<td>1.34</td>
<td>-0.86</td>
</tr>
</tbody>
</table>

Note. $p=.406$, df=1,13.

Table 25 indicates the ranges, modes, medians, and means for the weighted total time to plan and prepare a sequenced course outline. The data summarized in Table 25 illustrated that the means for the control and the experimental group were 3.46 hours and 2.21 hours respectively.
Table 25
Weighted Total Time to Plan and Prepare a Sequenced Course Outline

<table>
<thead>
<tr>
<th></th>
<th>Control Group n=7</th>
<th>Experimental Group n=8</th>
<th>Total N=15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>4.13</td>
<td>5.53</td>
<td>5.50</td>
</tr>
<tr>
<td>Mode</td>
<td>2.90</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Median</td>
<td>3.00</td>
<td>1.78</td>
<td>2.50</td>
</tr>
<tr>
<td>Mean</td>
<td>3.46</td>
<td>2.21</td>
<td>2.79</td>
</tr>
</tbody>
</table>

The control group had a slightly greater mean for the total time to develop a sequenced course outline. There was no significant difference in weighted total time between the control and the experimental groups at the .05 level (t-test value of -1.50, Table 26).
Table 26

Comparison of Weighted Total Time to Develop a Sequenced Course Outline for Control and Experimental Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>3.46</td>
<td>1.33</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>2.21</td>
<td>1.81</td>
<td>-1.50</td>
</tr>
</tbody>
</table>

Note. $p=.158$, df=1,13.

Research objective four. Assess the completed sequenced course outlines, which were developed by the control group and the experimental group, by curriculum development experts in the Department of Agricultural Education at The Ohio State University and the Ohio Department of Education.

Data reported in Table 27 indicate the frequencies of the scores on criterion one (There are an adequate number of problem area for each grade level for the control group and the experimental group.) for the control group and the experimental group. The mean score for the control group was 88.33 and the experimental group had a mean score of 81.46. The scores were based on a 100 point scale.
Table 27

Scores on Criterion One. There are an Adequate Number of Problem Areas for Each Grade Level, for the Control and the Experimental Groups

<table>
<thead>
<tr>
<th>Scores</th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60</td>
<td>-</td>
<td>-</td>
<td>0.0</td>
</tr>
<tr>
<td>60 - 69</td>
<td>-</td>
<td>-</td>
<td>0.0</td>
</tr>
<tr>
<td>70 - 79</td>
<td>-</td>
<td>3</td>
<td>0.0</td>
</tr>
<tr>
<td>80 - 89</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>90 - 100</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7</strong></td>
<td><strong>8</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

Mean 88.33  81.46  84.90

A significant difference existed at the .05 level between the control group and the experimental group on criterion one. Table 28 indicates a t-test value of -2.39 with mean scores of 88.33 and 81.46 for the control and experimental groups respectively.
Table 28

**Comparison of Group Means on Adequate Number of Problem Areas for Each Grade Level**

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>88.33</td>
<td>3.19</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>81.46</td>
<td>6.98</td>
<td>-2.39*</td>
</tr>
</tbody>
</table>

*Note.* $p=.033$, df=1,13.

*p<.05

Scores on criterion two (Problem areas are logically sequenced within the school year.) are contained in Table 29. The control group had a mean score of 83.81 and approximately 86% had scores between 80 and 89. The experimental group had a mean score of 75.63 and approximately 13% had scores between 80 and 89. The difference between the means of the control group and the experimental group were not statistically different as illustrated in Table 30 (t-test score of -1.91) at the .05 level.
Table 29

Scores on Criterion Two, Problem Areas are Logically Sequenced Within the School Year, for the Control and the Experimental Groups

<table>
<thead>
<tr>
<th>Scores</th>
<th>Control Group</th>
<th></th>
<th></th>
<th>Experimental Group</th>
<th></th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
<td>%</td>
<td>f</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 60</td>
<td>-</td>
<td>0.0</td>
<td>1</td>
<td>12.5</td>
<td>1</td>
<td>6.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 - 69</td>
<td>-</td>
<td>0.0</td>
<td>2</td>
<td>25.0</td>
<td>2</td>
<td>13.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70 - 79</td>
<td>-</td>
<td>0.0</td>
<td>4</td>
<td>50.0</td>
<td>4</td>
<td>26.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80 - 89</td>
<td>6</td>
<td>85.71</td>
<td>1</td>
<td>12.5</td>
<td>7</td>
<td>46.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90 - 100</td>
<td>1</td>
<td>14.29</td>
<td>-</td>
<td>0.0</td>
<td>1</td>
<td>6.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100</td>
<td>8</td>
<td>100</td>
<td>15</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>83.81</td>
<td></td>
<td>75.63</td>
<td></td>
<td>79.72</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 30

Comparison of Group Means for Criterion Two, Problem Areas are Logically Sequenced

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>83.81</td>
<td>3.69</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>75.63</td>
<td>10.76</td>
<td>-1.91</td>
</tr>
</tbody>
</table>

Note. p=.079, df=1,13.

Scores reported in Table 31 on criterion three (Problem areas are repeated when appropriate within a grade level and/or between grade levels.) were determined by the use of "Vocational Agriculture Course Outline Score Sheet." The mean scores for the control and the experimental groups were 57.14 and 51.46 respectively. No significance difference existed between the two groups on criterion three as revealed by a t-test value of -.79 (Table 32).
Table 31

Scores on Criterion Three. Problem Areas are Repeated When Appropriate within a Grade Level and/or Between Grade Levels, for the Control Group and the Experimental Group

<table>
<thead>
<tr>
<th>Scores</th>
<th>Control Group</th>
<th></th>
<th>Experimental Group</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
<td>%</td>
<td>f</td>
</tr>
<tr>
<td>&lt; 60</td>
<td>3</td>
<td>42.86</td>
<td>5</td>
<td>62.5</td>
<td>8</td>
</tr>
<tr>
<td>60 - 69</td>
<td>1</td>
<td>14.29</td>
<td>-</td>
<td>-0.0</td>
<td>1</td>
</tr>
<tr>
<td>70 - 79</td>
<td>1</td>
<td>14.29</td>
<td>1</td>
<td>12.5</td>
<td>2</td>
</tr>
<tr>
<td>80 - 89</td>
<td>2</td>
<td>28.57</td>
<td>2</td>
<td>25.0</td>
<td>4</td>
</tr>
<tr>
<td>90 - 100</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
</tr>
</tbody>
</table>

Total 7 100 8 100 15 100

Mean 57.14 51.46 54.3
Table 32
Comparison of Group Means on the Criterion. Problem Areas are Repeated When Appropriate

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>57.14</td>
<td>14.96</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>51.46</td>
<td>12.45</td>
<td>-.79</td>
</tr>
</tbody>
</table>

Note.  $p=.443$, df=1,13.

Table 33 provides the frequency data on criterion four (Problem areas for each year are appropriate for the intended grade level.) for the control and experimental groups. The control group had a mean score of 87.38 on a scale of 100. The experimental group had a mean score of 71.88. A t-test value (-2.84) reported in Table 34 indicated a significantly higher mean for the control group on criterion four at the .05 level.
Table 33

Scores on Criterion Four, Problem Areas for Each Year are Appropriate for the Intended Grade Level, for the Control Group and the Experimental Group

<table>
<thead>
<tr>
<th>Scores</th>
<th>Control Group</th>
<th></th>
<th></th>
<th>Experimental Group</th>
<th></th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
<td>%</td>
<td>f</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 60</td>
<td>-</td>
<td>0.0</td>
<td>2</td>
<td>25.0</td>
<td>2</td>
<td>13.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 - 69</td>
<td>-</td>
<td>0.0</td>
<td>2</td>
<td>25.0</td>
<td>2</td>
<td>13.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70 - 79</td>
<td>2</td>
<td>28.57</td>
<td>1</td>
<td>12.5</td>
<td>3</td>
<td>20.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80 - 89</td>
<td>3</td>
<td>42.86</td>
<td>2</td>
<td>25.0</td>
<td>5</td>
<td>33.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90 - 100</td>
<td>2</td>
<td>28.57</td>
<td>1</td>
<td>12.5</td>
<td>3</td>
<td>20.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100</td>
<td>8</td>
<td>100</td>
<td>15</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>87.38</td>
<td>71.88</td>
<td>79.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 34

Comparison of Scores on Problem Areas for Each Year are Appropriate

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
<th>Note. p=.014, df=1,13.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>87.38</td>
<td>5.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>71.88</td>
<td>13.55</td>
<td>-2.84*</td>
<td></td>
</tr>
</tbody>
</table>

The frequency data listed in Table 35 for criterion five (Overall selection of problem areas for the document is excellent.) indicate that the mean for the control group (84.05) was slightly greater than the experimental group (79.79).
Table 35

Scores on Criterion Five, the Overall Selection of Problem Areas for the Document is Excellent, for the Control and the Experimental Groups

<table>
<thead>
<tr>
<th>Scores</th>
<th>Control Group</th>
<th></th>
<th>Experimental Group</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>60 - 69</td>
<td>0.0</td>
<td>1</td>
<td>12.5</td>
<td>1</td>
<td>6.67</td>
</tr>
<tr>
<td>70 - 79</td>
<td>1</td>
<td>14.29</td>
<td>1</td>
<td>12.5</td>
<td>2</td>
</tr>
<tr>
<td>80 - 89</td>
<td>6</td>
<td>85.71</td>
<td>5</td>
<td>62.5</td>
<td>11</td>
</tr>
<tr>
<td>90 - 100</td>
<td>-</td>
<td>0.0</td>
<td>12.5</td>
<td>1</td>
<td>6.67</td>
</tr>
</tbody>
</table>

Total | 7  | 100   | 8  | 100    | 15 | 100   |

Mean | 84.05 | 79.79 | 81.92 |

The data reported in Table 36 show the control group and experimental groups had mean scores of 84.05 and 79.79 respectively. No significant difference existed between the control and experimental groups on criterion five with a t-test value of -1.46.
Table 36

Comparison of Group Means for the Selection of Problem Areas

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>84.05</td>
<td>3.71</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>79.79</td>
<td>6.87</td>
<td>-1.46</td>
</tr>
</tbody>
</table>

Note. p=.168, df=1,13.

Table 37 reports the frequencies of scores on criterion six [The document is legible (readable).] for the control and experimental groups. The mean scores for the control and the experimental groups were 94.38 and 70.54 respectively.
Table 37
Scores on Criterion Six, the Document is Legible
(readable), for the Control and the Experimental Groups

<table>
<thead>
<tr>
<th>Scores</th>
<th>Control Group</th>
<th>%</th>
<th>Experimental Group</th>
<th>%</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60</td>
<td>-</td>
<td>0.0</td>
<td>2</td>
<td>25.0</td>
<td>2</td>
<td>13.33</td>
</tr>
<tr>
<td>60 - 69</td>
<td>-</td>
<td>0.0</td>
<td>1</td>
<td>12.5</td>
<td>1</td>
<td>6.67</td>
</tr>
<tr>
<td>70 - 79</td>
<td>-</td>
<td>0.0</td>
<td>2</td>
<td>25.0</td>
<td>2</td>
<td>13.33</td>
</tr>
<tr>
<td>80 - 89</td>
<td>1</td>
<td>14.29</td>
<td>2</td>
<td>25.0</td>
<td>3</td>
<td>20.0</td>
</tr>
<tr>
<td>90 - 100</td>
<td>6</td>
<td>85.71</td>
<td>1</td>
<td>12.5</td>
<td>7</td>
<td>46.67</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100</td>
<td>8</td>
<td>100</td>
<td>15</td>
<td>100</td>
</tr>
<tr>
<td>Mean</td>
<td>94.38</td>
<td></td>
<td>70.54</td>
<td></td>
<td>82.46</td>
<td></td>
</tr>
</tbody>
</table>

Table 38 shows that the control group had a mean score of 94.38 and the experimental group had a mean score of 70.54. A t-test value of -2.72 is displayed which indicates a significantly higher mean score for the control group at the .05 level.
Table 38

Comparison of Group Means for Criterion Six, the Document is Legible

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>94.38</td>
<td>5.39</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>70.54</td>
<td>22.52</td>
<td>-2.72*</td>
</tr>
</tbody>
</table>

Note. p=.017, df=1,13.
*p<.05.

The two groups were compared on criterion seven (The document has adequate margins.) as displayed in Table 39. The mean of the control group was 89.52 and the mean of the experimental group was 73.54. A t-test (t = -1.87) comparison did not indicate a significant difference between the control group and the experimental group (Table 40).
Table 39
Scores on Criterion Seven, the Document has Adequate Margins, for the Control and the Experimental Groups

<table>
<thead>
<tr>
<th>Scores</th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
</tr>
<tr>
<td>&lt; 60</td>
<td></td>
<td>0.0</td>
<td>2</td>
</tr>
<tr>
<td>60 - 69</td>
<td></td>
<td>0.0</td>
<td>2</td>
</tr>
<tr>
<td>70 - 79</td>
<td>2</td>
<td>28.57</td>
<td>0</td>
</tr>
<tr>
<td>80 - 89</td>
<td>1</td>
<td>14.29</td>
<td>2</td>
</tr>
<tr>
<td>90 - 100</td>
<td>4</td>
<td>57.12</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100</td>
<td>8</td>
</tr>
</tbody>
</table>

Mean

Control Group | 89.52
Experimental Group | 73.54
Total | 81.53
Table 40

Comparison of Group Means for the Document has Adequate Margins

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>89.52</td>
<td>10.66</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>73.54</td>
<td>20.23</td>
<td>-1.87</td>
</tr>
</tbody>
</table>

Note.  \( p = .084, \ df = 1,13. \)

The frequency data presented in Table 41 for criterion eight (The document could be given to parents, administration, and students based on the overall format/appearance.) indicate that the control group had a mean score of 81.43 and the experimental group had a mean score of 58.46.
Table 41
Scores on Criterion Eight, the Document Could be Given to Parents, Administration, and Students Based on the Overall Format/Appearance of the Document, for the Control and the Experimental Groups

<table>
<thead>
<tr>
<th>Scores</th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60</td>
<td>-</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>60 - 69</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>70 - 79</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>80 - 89</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>90 - 100</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

A t-test value (-2.12) reported on Table 42 indicated no significant difference between the control and experimental group means on criterion eight at the 0.05 level.
Table 42

Comparison of Group Means on Criterion Eight, the Document Could be Given to Parents, Administration, and Students

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>81.43</td>
<td>11.44</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>58.46</td>
<td>26.48</td>
<td>-2.12</td>
</tr>
</tbody>
</table>

Note. p=.054, df=1,13.

Table 43 indicates the frequencies of scores on criterion nine [The cover page and title (one for each year taught.) pages are adequate] for the control and experimental groups. The control group and the experimental group had mean scores of 62.14 and 41.46 respectively.

Table 44 provides data indicating a t-test value of -1.11 which indicates no significant difference between the two groups at the .05 level.
Table 43

Scores on Criterion Nine, the Cover Page and Title (one for each year taught) Pages are Adequate, for the Control and the Experimental Groups

<table>
<thead>
<tr>
<th>Scores</th>
<th>Control Group</th>
<th></th>
<th>%</th>
<th>Experimental Group</th>
<th></th>
<th>%</th>
<th>Total</th>
<th></th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60</td>
<td>4</td>
<td>57.14</td>
<td>5</td>
<td>62.5</td>
<td>9</td>
<td>60.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 - 69</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70 - 79</td>
<td>1</td>
<td>14.29</td>
<td>-</td>
<td>0.0</td>
<td>1</td>
<td>6.67</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80 - 89</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90 - 100</td>
<td>2</td>
<td>28.57</td>
<td>3</td>
<td>37.5</td>
<td>5</td>
<td>33.33</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total | 7 | 100 | 8 | 100 | 15 | 100 |

Mean | 62.14 | 41.46 | 51.8 |
Table 44
Comparison of Group Means for the Adequacy of Cover Page and Title Pages

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>62.14</td>
<td>16.63</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>41.46</td>
<td>46.76</td>
<td>-1.11</td>
</tr>
</tbody>
</table>

Note. *p*=.289, df=1,13.

Scores on criterion ten as indicated in Table 45 (Punctuation, grammar, and spelling are correct throughout the document.) for the control and the experimental groups. The control group had a mean of 90.62 and the experimental group had a mean of 92.92.
Table 45

Scores on Criterion Ten. Punctuation, Grammar, and Spelling are Correct Throughout the Document, for the Control and the Experimental Groups

<table>
<thead>
<tr>
<th>Scores</th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
</tr>
<tr>
<td>&lt; 60</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
</tr>
<tr>
<td>60 - 69</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
</tr>
<tr>
<td>70 - 79</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
</tr>
<tr>
<td>80 - 89</td>
<td>3</td>
<td>42.86</td>
<td>-</td>
</tr>
<tr>
<td>90 - 100</td>
<td>4</td>
<td>57.14</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100</td>
<td>8</td>
</tr>
</tbody>
</table>

Mean 90.62 92.92 91.77

Data reported show that the Control group had a mean score of 90.62 and the experimental group had a mean score of 92.92. Table 46 reports a t-test value of 1.68 which does not indicate a significant difference between the group means at the .05 level on criterion ten.
Table 46

Comparison of Group Means on Criterion Ten, Punctuation, Grammar, and Spelling are Correct

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>90.62</td>
<td>3.35</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>92.92</td>
<td>1.48</td>
<td>1.68</td>
</tr>
</tbody>
</table>

Note.  p=.132, df=1,13.

Table 47 lists the frequencies of scores for subjects on the variable content (criteria one through five) for the control and the experimental groups. The mean of the control group was 80.14 and the mean of the experimental group was 72.04.
Table 47

Scores on the Variable Content (criteria one through five) for the Control and the Experimental Groups

<table>
<thead>
<tr>
<th>Scores</th>
<th>Control Group</th>
<th></th>
<th></th>
<th></th>
<th>Experimental Group</th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>0.0</td>
<td></td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
</tr>
<tr>
<td>60 - 69</td>
<td>-</td>
<td>0.0</td>
<td>3</td>
<td>37.5</td>
<td></td>
<td>3</td>
<td>20.0</td>
<td>7</td>
<td>46.67</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70 - 79</td>
<td>3</td>
<td>42.86</td>
<td>4</td>
<td>50.0</td>
<td></td>
<td>7</td>
<td>46.67</td>
<td>15</td>
<td>100</td>
<td>15</td>
<td>100</td>
<td>15</td>
</tr>
<tr>
<td>80 - 89</td>
<td>4</td>
<td>57.14</td>
<td>1</td>
<td>12.5</td>
<td></td>
<td>5</td>
<td>33.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90 - 100</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>0.0</td>
<td></td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100</td>
<td>8</td>
<td>100</td>
<td></td>
<td>15</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>80.14</td>
<td></td>
<td>72.04</td>
<td></td>
<td></td>
<td>76.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The mean score for the control group was 80.14 and the experimental group had a mean score of 72.04. There was a significantly higher mean for the control group on the variable content at the .05 level (t-test value of -2.53, Table 48).
### Table 48

**Comparison of Group Means on the Variable Content**

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>80.14</td>
<td>2.02</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>72.04</td>
<td>8.22</td>
<td>-2.53*</td>
</tr>
</tbody>
</table>

*Note. p=.025, df=1,13.*

*P<.05.*

The frequency of scores on the variable format (criteria six through ten) for the control group and the experimental group are illustrated in Table 49. The means for the control and the experimental groups were 83.62 and 67.38 respectively.
Table 49

Scores on the Variable Format (criteria six through ten) for the Control and the Experimental Groups

| Scores | Control Group | | | Experimental Group | | | Total | | |
|---|---|---|---|---|---|---|
| f | % | f | % | f | % |
| < 60 | - | 0.0 | 3 | 37.5 | 3 | 20.0 |
| 60 - 69 | - | 0.0 | 2 | 25.0 | 2 | 13.33 |
| 70 - 79 | 1 | 14.29 | 1 | 12.5 | 2 | 13.33 |
| 80 - 89 | 5 | 71.42 | 1 | 12.5 | 6 | 40.0 |
| 90 - 100 | 1 | 14.29 | 1 | 12.5 | 2 | 13.33 |
| Total | 7 | 100 | 8 | 100 | 15 | 100 |

Mean 83.62 67.38 75.5

Table 50 provides data indicating the means for the control and experimental groups which were 83.62 and 67.38 respectively. The t-test score of -2.23 indicated a significantly greater mean for the control group at the .05 level on the variable format.
Table 50

Comparison of Scores on the Variable Format for the Control and Experimental Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>83.62</td>
<td>10.85</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>67.38</td>
<td>20.08</td>
<td>-3.30*</td>
</tr>
</tbody>
</table>

Note.  p=.044, df=1,13.
*p<.05.

Table 51 indicates the scores on the combined variables content and format (criteria one through ten) for the control group and the experimental group. The control group had a mean of 81.88 and the experimental group had a mean score of 75.80. As displayed in Table 52, there was a significantly greater mean for the control group on the combined variables at the .05 level (t-test value of -2.58).
Table 51

Scores on the Combined Variables, Content and Format, for the Control and the Experimental Groups

<table>
<thead>
<tr>
<th>Scores</th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60</td>
<td>-</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>60 - 69</td>
<td>-</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>70 - 79</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>80 - 89</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>90 - 100</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>7 100</td>
<td>8 100</td>
<td>15 100</td>
</tr>
</tbody>
</table>

Mean: 81.73 69.61 75.67
Table 52

Comparison of Combined Scores on the Variables, Content and Format for the Control and Experimental Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>81.73</td>
<td>2.26</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>69.61</td>
<td>12.20</td>
<td>-2.58*</td>
</tr>
</tbody>
</table>

Note.  p=.023, df=1,13.
*p<.05.

The frequency data shown in Table 54 for the weighted scores on the variable content (criteria one through five) show that the control group and the experimental groups had mean scores of 80.31 and 72.26 respectively.
Table 53

Weighted Scores on the Variable Content (criteria one through five) for the Control and the Experimental Groups

<table>
<thead>
<tr>
<th>Scores</th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
</tr>
<tr>
<td>&lt; 60</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
</tr>
<tr>
<td>60 - 69</td>
<td>-</td>
<td>0.0</td>
<td>3</td>
</tr>
<tr>
<td>70 - 79</td>
<td>2</td>
<td>28.57</td>
<td>4</td>
</tr>
<tr>
<td>80 - 89</td>
<td>5</td>
<td>71.43</td>
<td>1</td>
</tr>
<tr>
<td>90 - 100</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100</td>
<td>8</td>
</tr>
</tbody>
</table>

Mean 80.31 72.26 76.29

The t-test value of -2.50 (Table 54) indicates a significantly higher mean for the control group on the weighted variable content at the .05 level.
Table 54

Comparison of Weighted Scores on the Variable Content for the Control and the Experimental Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>80.31</td>
<td>1.72</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>72.26</td>
<td>8.34</td>
<td>-2.50*</td>
</tr>
</tbody>
</table>

Note.  p=.027, df=1,13.

* p<.05.

The frequency of the weighted scores on the variable format (criteria six through ten) for the control and the experimental groups as indicated in table 55 shows the control group with a mean score of 86.05 and the experimental group with a mean score of 72.73.
Table 55

Weighted Scores on the Variable Format (criteria six through ten) for the Control and the Experimental Groups

<table>
<thead>
<tr>
<th>Scores</th>
<th>Control Group f</th>
<th>%</th>
<th>Experimental Group f</th>
<th>%</th>
<th>Total f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60</td>
<td></td>
<td>0.0</td>
<td></td>
<td></td>
<td>1</td>
<td>12.5</td>
</tr>
<tr>
<td>60 - 69</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td>2</td>
<td>25.0</td>
</tr>
<tr>
<td>70 - 79</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td>2</td>
<td>25.0</td>
</tr>
<tr>
<td>80 - 89</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td>2</td>
<td>25.0</td>
</tr>
<tr>
<td>90 - 100</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>12.5</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100</td>
<td></td>
<td>8</td>
<td>100</td>
<td>15</td>
</tr>
</tbody>
</table>

Mean

86.05

72.73

79.39

The control group and the experimental group had mean scores of 86.05 and 72.73 respectively. The control group mean was statistically higher on the weighted variable format at the .05 level (t-test value on -2.24, Table 56).
Table 56

Comparison of Weighted Scores on the Variable Format for the Control and Experimental Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>86.05</td>
<td>4.45</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>72.73</td>
<td>15.08</td>
<td>-2.24*</td>
</tr>
</tbody>
</table>

Note.  \( p=.043, df=1,13. \)

\*\( p<.05. \)

Table 57 provides data indicating the frequencies of the weighted scores on the combined variables, content and format (criteria one through ten) for the control and the experimental groups. The control group and the experimental group had means of 83.18 and 72.50 respectively. Table 59 indicates a significantly higher mean for the control group at the .05 level with a t-test value of -2.73.
Table 57

**Weighted Scores on the Combined Variables, Content and Format (criteria one through ten), for the Control and the Experimental Groups**

<table>
<thead>
<tr>
<th>Scores</th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60</td>
<td>- 0.0</td>
<td>- 0.0</td>
<td>- 0.0</td>
</tr>
<tr>
<td>60 - 69</td>
<td>- 0.0</td>
<td>4 50.0</td>
<td>4 26.67</td>
</tr>
<tr>
<td>70 - 79</td>
<td>- 0.0</td>
<td>2 25.0</td>
<td>2 13.33</td>
</tr>
<tr>
<td>80 - 89</td>
<td>7 100</td>
<td>1 12.5</td>
<td>8 53.33</td>
</tr>
<tr>
<td>90 - 100</td>
<td>- 0.0</td>
<td>1 12.5</td>
<td>1 6.67</td>
</tr>
<tr>
<td>Total</td>
<td>7 100</td>
<td>8 100</td>
<td>15 100</td>
</tr>
<tr>
<td>Mean</td>
<td>83.18</td>
<td>72.50</td>
<td>77.84</td>
</tr>
</tbody>
</table>
Table 58

Comparison of Weighted Scores on the Combined Variables, Content and Format, for the Control and Experimental Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>83.18</td>
<td>2.54</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>72.50</td>
<td>10.04</td>
<td>-2.73*</td>
</tr>
</tbody>
</table>

Note.  p=.017, df=1,13.

*p<.05.
Research objective five. Determine the attitudes of the preservice vocational agriculture teachers toward microcomputers. The attitudes of the control group and the experimental group toward microcomputers for each statement on the "Attitude Toward Microcomputers" instrument are reported in Appendix U. Table 59 shows the frequency data on the "Attitude Toward Microcomputers" instrument (Appendix K) for both the control group and the experimental group. The scores were based on a Likert-type scale that had a range of six with one representing "very strongly disagree" and six representing "very strongly agree." The control group had a mean score of 4.25 out of a possible 6.0. Of the students in the control group, approximately 71.5% had scores higher than 4.00, while almost 100% of the experimental group had scores higher than 4.00. The experimental group had a mean score of 4.56.
Table 59

Attitudes Toward Microcomputers by Group

<table>
<thead>
<tr>
<th>Score on Attitude Scale</th>
<th>Control Group</th>
<th>Experimental Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>&lt; 3.4</td>
<td>-</td>
<td>0.0</td>
</tr>
<tr>
<td>3.5 - 3.9</td>
<td>2</td>
<td>28.6</td>
</tr>
<tr>
<td>4.0 - 4.4</td>
<td>3</td>
<td>42.8</td>
</tr>
<tr>
<td>4.5 - 4.9</td>
<td>2</td>
<td>28.6</td>
</tr>
<tr>
<td>5.0 - 5.4</td>
<td>-</td>
<td>0.0</td>
</tr>
<tr>
<td>&gt; 5.5</td>
<td>-</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>Mean</td>
<td>4.25</td>
<td></td>
</tr>
</tbody>
</table>

Data displayed in Table 60 shows the t-test comparison between the two groups on their attitudes toward microcomputers. The t-test value of 1.47 indicated no significant difference between the control group and the experimental group on attitudes toward microcomputers at the .05 level.
Table 60

Comparison of Attitude Toward Microcomputers by Group

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of Cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>4.25</td>
<td>.407</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>4.56</td>
<td>.401</td>
<td>1.47</td>
</tr>
</tbody>
</table>

Note.  p=.165, df=1,13.

Research objective six. Determine the average number of problem areas sequenced per year by the preservice vocational agriculture teachers included in this study.

The frequency data for the number of problem areas sequenced is shown in Table 61 for the control and the experimental groups. The control group had a range of 4.2 problem areas sequenced and the experimental group had a range of 15.5 problem areas sequenced. The mean number of problem areas sequenced for the control group and experimental group were 19.54 and 14.93 respectively.
Table 61

Average Number of Problem Areas Sequenced Per Year for the Control Group and the Experimental Group

<table>
<thead>
<tr>
<th></th>
<th>Control Group n=7</th>
<th>Experimental Group n=8</th>
<th>Total N=15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>4.2</td>
<td>15.5</td>
<td>15.5</td>
</tr>
<tr>
<td>Mode</td>
<td>21</td>
<td>11.3</td>
<td>21</td>
</tr>
<tr>
<td>Median</td>
<td>19.5</td>
<td>12.5</td>
<td>18.5</td>
</tr>
<tr>
<td>Mean</td>
<td>19.54</td>
<td>14.93</td>
<td>17.08</td>
</tr>
</tbody>
</table>

To determine if the control group and the experimental group differed statistically on the average number of problem areas which the subjects sequenced, the means of the two groups were analyzed using a t-test. The mean number of problem areas sequenced was 19.54 for the control group and 14.93 problem areas for the experimental group. The control group had slightly more problem areas which were sequenced but the two groups were not significantly different at the .05 level (t-test value of -2.04, Table 62).
Table 62
Comparison of Average Number of Problem Areas Sequenced per Year by Group

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>19.54</td>
<td>1.60</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>14.93</td>
<td>5.79</td>
<td>-2.04</td>
</tr>
</tbody>
</table>

Note.  p=.063, df=1,13.

Summary of the Findings

The findings of the study related to the research objective attitude toward microcomputers indicated that the experimental group had a mean score of 3.96 on the summated Likert-type scale which ranged from one, "very strongly disagree," to six, "very strongly agree." The panel of computer experts had a mean score of 4.54 on the instrument "Attitude Toward Microcomputers."

The control group required slightly more planning, typing and total time than the experimental group. The mean number of hours to plan a sequenced course outline for the control group was 3.97 hours and 2.83 hours for the experimental group. The mean number of hours to type a sequenced course outline for the control group was 4.40
hours and the experimental group required an average of 2.95 hours to enter the data on a microcomputer. The mean number of total hours to plan and type a sequenced course outline for the control group and the experimental group were 8.37 hours and 5.78 hours respectively. Although the planning time and typing time for the control group was slightly higher, no significant difference was found between the two groups at the .05 level.

Weighted times were calculated for planning time, typing or computer entry time, and total combined times for the two groups. The weighted planning time for the control group had a mean of 1.71 hours. The experimental group had a mean of .97 hours. The control group and the experimental group had weighted typing or computer entry time means of 1.74 and 1.24 hours respectively. The weighted total time to plan and prepare a sequenced course outline for the control and the experimental groups were 2.21 and 1.81 hours respectively. There were no significant differences between the two groups on weighted planning time, weighted typing or computer entry time, or the total combined planning and preparation time at the .05 level.
The findings of the study indicated that the control group sequenced more problem areas per year (19.5) than the experimental group (14.9). There was no significant difference between the two groups on the number of problem areas sequenced per year at the .05 level.

As noted in Table 63, the means for the control group on criteria one through nine, content, format, combined total, weighted content, weighted format, and weighted combined total scores were slightly larger than the means for the experimental group. The experimental group had a slightly larger mean on criterion ten. Significantly higher means were found for the control group on criteria one (There are an adequate number of problem areas for each grade level.), four [Problem areas for each year are appropriate for the intended grade level.), and six (The document is legible (readable).] at the .05 level. The means of the control group for the variables content, format, and the combined variables (content and format) were shown to be statistically higher at the .05 level. The means of the control group for the weighted variables content, format, and the combined variables (content and format) were also significantly higher at the .05 level.
Table 63

**Summary of Comparisons for the Completed Sequenced Course**

**Outlines by Group**

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Group</th>
<th>Number of cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control</td>
<td>7</td>
<td>88.33</td>
<td>3.19</td>
<td>-2.39</td>
<td>.033</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>81.46</td>
<td>6.98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Control</td>
<td>7</td>
<td>83.81</td>
<td>3.70</td>
<td>-1.91</td>
<td>.079</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>75.63</td>
<td>10.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Control</td>
<td>7</td>
<td>57.14</td>
<td>14.96</td>
<td>-.79</td>
<td>.443</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>51.46</td>
<td>12.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Control</td>
<td>7</td>
<td>87.38</td>
<td>5.17</td>
<td>-2.84</td>
<td>.014</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>71.88</td>
<td>13.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Control</td>
<td>7</td>
<td>84.05</td>
<td>3.71</td>
<td>-1.46</td>
<td>.168</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>79.79</td>
<td>6.87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Control</td>
<td>7</td>
<td>94.38</td>
<td>5.39</td>
<td>-2.72</td>
<td>.017</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>70.54</td>
<td>22.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Control</td>
<td>7</td>
<td>89.52</td>
<td>10.66</td>
<td>-1.87</td>
<td>.084</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>73.54</td>
<td>20.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Control</td>
<td>7</td>
<td>81.43</td>
<td>11.44</td>
<td>-2.12</td>
<td>.054</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>58.46</td>
<td>26.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Control</td>
<td>7</td>
<td>62.14</td>
<td>16.63</td>
<td>-1.11</td>
<td>.289</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>8</td>
<td>41.46</td>
<td>46.76</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 63 (continued)

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Experimental</th>
<th>Control</th>
<th>Experimental</th>
<th>Control</th>
<th>Experimental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>7</td>
<td>81.88</td>
<td>8</td>
<td>69.71</td>
<td>81.88</td>
<td>69.71</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>80.62</td>
<td>92.92</td>
<td>1.48</td>
<td>92.92</td>
<td>1.48</td>
</tr>
<tr>
<td>Format</td>
<td>7</td>
<td>80.14</td>
<td>72.04</td>
<td>8.22</td>
<td>-2.53*</td>
<td>.025</td>
</tr>
<tr>
<td>(1-10)</td>
<td>8</td>
<td>83.62</td>
<td>67.38</td>
<td>18.71</td>
<td>-2.23*</td>
<td>.044</td>
</tr>
<tr>
<td>Weighted</td>
<td>7</td>
<td>80.31</td>
<td>72.26</td>
<td>8.34</td>
<td>-2.50*</td>
<td>.027</td>
</tr>
<tr>
<td>Content</td>
<td>8</td>
<td>86.05</td>
<td>72.73</td>
<td>15.08</td>
<td>-2.24*</td>
<td>.043</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>83.18</td>
<td>72.50</td>
<td>10.04</td>
<td>-2.73*</td>
<td>.017</td>
</tr>
</tbody>
</table>

*p < .05.
CHAPTER V

Summary, Discussion, Conclusions and Recommendations

Summary of Introduction

**Purposes.** The purposes of this study were (a) to develop a microcomputer-managed sequenced course outline program, (b) to determine the extent to which the software program was accepted by the preservice vocational agriculture teachers, (c) to determine the extent to which the software program improved the efficiency of the preservice vocational agriculture teachers in developing their sequenced course outline, and (d) to determine if the software program would meet the minimum requirements of agricultural education faculty concerned with program planning at The Ohio State University.

**Research objectives.** The following research objectives were developed for this study.

1. Develop a microcomputer-managed sequenced course outline program which would meet the minimum requirements of Agricultural Education 585, Instructional Program Planning for Vocational Education.
2. Determine the utility of the software program as perceived by the preservice vocational agriculture teachers who used the microcomputer-managed sequenced course outline program and as perceived by a review team of computer experts.

3. Determine the amount of time required to plan and type the class assignment by traditional methods as compared to the time required to plan and enter the class assignment using the software program.

4. Assess the completed sequenced course outlines which were developed by the control group and the experimental group by curriculum development experts in the Department of Agricultural Education, The Ohio State University and the Division of Agricultural Education, Ohio Department of Education.

5. Determine the attitudes of the preservice vocational agriculture teachers included in this study toward microcomputers.

6. Determine the average number of problem areas sequenced per year by the preservice vocational agriculture teachers included in this study.
Summary of Methodology

Introduction. This study was experimental research of a developmental nature. The characteristics of interest included in this study were (a) preservice vocational agriculture teacher attitudes toward the microcomputer-managed sequenced course outline program, (b) attitudes of the subjects toward microcomputers, (c) a comparison of the control group and the experimental group on the time required to plan and type or enter into the microcomputer the information needed to produce a sequenced course outline, (d) a comparison of the completed sequenced course outlines developed by the control group and the experimental group, (e) a comparison of the number of problem areas sequenced per year by the control group and the experimental group, and (f) selected demographic information.

Population. The population for the evaluation component of this study consisted of 15 senior agricultural education majors enrolled in Agricultural Education 585 (Instructional Program Planning for Vocational Agriculture) Spring Quarter 1986. Participants were randomly selected and assigned to the control and the experimental groups. Students enrolled in Agricultural Education 585 during the study constituted the experimentally accessible population.
Design. The design for the evaluation of the microcomputer-managed sequenced course outline program was similar to the pretest posttest control group design described by Campbell and Stanley (1963).

The active independent variable was the method by which the sequenced course outlines were developed. The two levels of the independent variable were: (a) development of a sequenced course outline by traditional methods and (b) development of a sequenced course outline by a microcomputer-managed sequenced course outline program.

Dependent variables included time required for completion of the sequenced course outline, attitudes of the subjects toward the microcomputer-managed sequenced course outline program, and scores received by the subjects on the completed sequenced course outlines.

Instrumentation. The data for this study were collected via six researcher-developed instruments (Appendices K, L, M, O, P, & R) and one instrument (Appendix I) was developed by the instructor for Agricultural Education 585. "Attitude Toward Microcomputers" was an instrument developed employing a six point Likert-type scale to measure attitudes toward microcomputers. The instrument was pilot tested and field tested for reliability and validity. An additional six point Likert-type scale developed by the researcher was "Software Evaluation." This
instrument was also pilot tested for reliability and validity. The "Software Evaluation" instrument was also used by a panel of computer experts to evaluate the software program and inter-rater reliability was determined. An instrument to record the amount of time was developed by the researcher. This instrument, "Time Requirements," was pilot tested for validity.

The "Vocational Agriculture Course Outline" instrument was the completed sequenced course outline developed by the subjects and these outlines were evaluated by a panel of experts using the "Vocational Agriculture Course Outline Score Sheet." Two variables (content and format) were identified by the researcher which should be evaluated. Each variable contained five criteria which were rated by the panel of curriculum experts. The instrument was determined to have content validity by a panel of experts. Inter-rater reliability was also determined.

Data collection. Data were collected in several stages during the study. The subjects were also requested to keep a log of the time required to complete a sequenced course outline. The two faculty panels completed their instruments after completion of all instruments by the subjects. Some of the demographic data such as GPA was collected from existing university records. All of the subjects enrolled in Agricultural Education 585 were included in the study.
Data analysis. The data were coded and entered by the use of a text editor onto a floppy disk on an IBM-PC microcomputer. This permitted the researcher to analyze the data by means of a statistical program, Statistical Package for the Social Sciences, version 1.1, (SPSS/PC, 1986) designed to operate on a microcomputer. Statistics employed included: frequencies, measures of variability, measures of central tendency, and t-tests. Reliability was determined by the SPSSX program (version 2.1) on the mainframe at the Instruction and Research Computer Center at The Ohio State University. All inter-rater reliabilities were calculated by hand using a version of the Kuder-Richardson formula 20 (Ebel, 1979, pp. 282-284).

Summary of Findings

The demographic variables selected for comparing the two groups were GPA, attitude toward computers, typing experience, age, gender, computer experience, current computer use, and computer training. The analysis of data indicated no significant difference between the two groups on the demographic variables except gender (t-test value was -3.04). The control group was approximately evenly divided between female and male subjects whereas the experimental group had all male subjects.
The utility of the program perceived by the experimental group and a panel of computer experts was determined using a summated Likert-type scale. On a six point scale (six being "very strongly agree"), the experimental group "agreed" (mean = 3.96) and the panel of computer experts "strongly agreed" (mean = 4.61) that the program had utility.

The amount of planning time, typing or computer entry time, total (planning and typing or computer entry) time, weighted planning time, weighted typing or computer entry time, and weighted total time were analyzed. Results of the analysis revealed no statistical differences between the control group and the experimental group on any of the variables regarding time at the .05 level.

The panel of experts rated the completed sequenced course outlines higher on criteria one through nine for the control group (Table 64). Criteria one through five were statements about the content (number, selection, and sequencing of problem areas) of the documents. Criteria six through ten were statements about the format (margins, cover page, readability, etc.) of the documents. Only criterion ten (punctuation, grammar, and spelling) was rated higher by the panel of experts for the experimental group. The control group had a statistically higher mean on criteria one, four, and six at the .05 level. The means for the
control group were significantly higher on the variables content (criteria one through five), format (criteria six through ten), combined variables (content and format), weighted variable content, weighted variable format, and weighted combined variables (weighted content and weighted format) at the .05 level.

Table 64
Mean and Standard Deviations for Criteria Statements by Group

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Control Group (n=7)</th>
<th>Experimental Group (n=7)</th>
<th>Total (N=15)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
<td>Mean</td>
</tr>
<tr>
<td>1</td>
<td>88.33</td>
<td>3.19</td>
<td>81.46</td>
</tr>
<tr>
<td>2</td>
<td>83.81</td>
<td>3.70</td>
<td>75.63</td>
</tr>
<tr>
<td>3</td>
<td>57.14</td>
<td>14.96</td>
<td>51.46</td>
</tr>
<tr>
<td>4</td>
<td>87.38</td>
<td>5.17</td>
<td>71.88</td>
</tr>
<tr>
<td>5</td>
<td>84.05</td>
<td>3.71</td>
<td>79.79</td>
</tr>
<tr>
<td>6</td>
<td>94.38</td>
<td>5.39</td>
<td>70.54</td>
</tr>
<tr>
<td>7</td>
<td>89.52</td>
<td>10.66</td>
<td>73.54</td>
</tr>
<tr>
<td>8</td>
<td>81.43</td>
<td>11.44</td>
<td>58.46</td>
</tr>
<tr>
<td>9</td>
<td>62.14</td>
<td>16.63</td>
<td>41.46</td>
</tr>
<tr>
<td>10</td>
<td>90.62</td>
<td>3.35</td>
<td>92.92</td>
</tr>
<tr>
<td>Total</td>
<td>81.88</td>
<td>11.72</td>
<td>69.71</td>
</tr>
</tbody>
</table>
Table 64 (continued)

<table>
<thead>
<tr>
<th></th>
<th>(1 - 5)</th>
<th>(6 - 10)</th>
<th>(1 - 10)</th>
<th>Weighted Content</th>
<th>Weighted Format</th>
<th>Weighted Content &amp; Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>80.14</td>
<td>83.62</td>
<td>81.74</td>
<td>80.31</td>
<td>86.05</td>
<td>83.18</td>
</tr>
<tr>
<td>Format</td>
<td>2.02</td>
<td>4.52</td>
<td>2.26</td>
<td>1.72</td>
<td>4.52</td>
<td>2.54</td>
</tr>
<tr>
<td>Combined</td>
<td>72.04</td>
<td>67.38</td>
<td>69.61</td>
<td>72.26</td>
<td>72.73</td>
<td>72.50</td>
</tr>
<tr>
<td></td>
<td>8.22</td>
<td>18.71</td>
<td>12.20</td>
<td>8.34</td>
<td>15.08</td>
<td>10.04</td>
</tr>
</tbody>
</table>

*Grand mean.

Discussion

There were two phases to this study. The first phase was the development of the microcomputer-managed sequenced course outline program. The second phase was the evaluation of (a) whether the experimental group required less time than the control group to develop a sequenced course outline and (b) the quality of the completed sequenced course outlines developed by the subjects.
Development. Though all subjects in the experimental group indicated that they had completed a college level computer course, results of the evaluation on the completed sequenced course outlines suggested that the subjects had not mastered certain outcomes which a computer course should have provided. Some of the observed problems with the documents could have been due to careless workmanship or lack of computer skills. For example, some students (a) started printing in the middle of the page, (b) did not leave a margin at the top of the page, (c) did not check the ribbon quality before printing and the product was illegible or very faint, and (d) the copies of the completed projects made by the researcher for evaluation were third generation copies which resulted in further deterioration of the quality of the projects.

The development of a software program is a continuous process. The pilot test group, the experimental group and the panel of computer experts made specific suggestions on how to improve the software program. Several of the comments and/or suggestions were: (a) more on screen prompts are needed, (b) the use of all capital letters was hard to read, (c) more help prompts, (d) could not move up and down in lists of options, (e) had to leave the program to save the file, (f) need a command reference chart, (g) different prompts for different parts of the program, and
Several strengths of the software program mentioned by the three groups were: (a) saved time, (b) had good flexibility to meet the needs of local teachers, (c) required minimal typing, (d) provided guidelines for development of course outlines, (e) quick and easy, (f) fast and accurate way to store curriculum information, and (g) can be expanded to meet local needs.

The needs of agricultural teachers vary across the state. Other educational units (county, district, state, etc.) require different information for developing course outlines. The "Vocational Program Suggested Course of Study Checklist for PRIDE Review" (Appendix W) has been used by Ohio Agricultural Education Supervisors, Ohio Department of Education to verify that each course of study, prepared by vocational agriculture teachers meets the minimum requirements of the Ohio Department of Education. The course of study checklist requires: (a) statement of approval by board of education, (b) district philosophy and goals, (c) scope and sequence, (d) pupil evaluation policy, (e) complete sequenced course outline based on task analysis, (f) instructional program strategies, (g) grouped and scheduled laboratory activities, and (h) organized related instructional content.
Many local school districts require additional information or a different report form and/or format than required by the Ohio State Department of Education. An example is taken from the Dayton, Ohio Public School System "Course Outline" (undated). In addition to the requirements of the Ohio Department of Education, the Dayton Board requires a list of entry-level occupations, a description of vocational youth organization activities and a list of references.

Evaluation. The results of the data for the second phase of this study were based on the analysis of (a) time required to plan and develop a sequenced course outline and (b) scores on the completed sequenced course outline prepared by the subjects.

The researcher requested that all subjects keep an accurate record of planning and preparation time to develop a sequenced course outline. There was no attempt by the researcher to determine if the subjects in the experimental group practiced with the software program (a) prior to planning, (b) during planning or (c) during preparation of a sequenced course outline. Since the subjects in the experimental group were not precise in recording descriptors relating to the practice time on the "Time Log," no attempt was made by the researcher to exclude time to learn the computer from planning time and/or preparation time.
One observable effect in the control group was that several subjects used a word processor in lieu of a typewriter. As a result, the total time required to complete the sequenced course outlines by the control group would be less than if all the subjects had used a typewriter. This would reduce the time difference (resulting in a more conservative estimate of the time actually saved by the experimental group) between the two groups but would not otherwise be an external validity threat to the subjects in the experimental group.

**Comments by the panel of raters.** The researcher interviewed each of the raters by telephone to gain additional insight on their standards for rating the completed sequenced course outlines on the ten criteria statements presented by the researcher. On criterion one (There are an adequate number of problem areas for each grade level.), the panel of experts indicated that they had based their decisions on experience, a core curriculum guide or by using a sample course of study guide. None of the raters counted the number of problem areas, even though the subjects were requested by the course instructor to sequence 20 to 22 problem areas.
The raters on criterion two (Problem areas are logically sequenced within the school year.) based their ratings on some logical order of sequencing, that is, simple to complex, logical beginning and end, by seasons (for example, soils and harvesting in the fall or planters and plant nutrition in the spring), and by FFA contest schedules.

Several of the raters indicated that more emphasis was placed on problem areas that were repeated between grade levels than within grade levels for criterion three (Problem areas are repeated when appropriate within a grade level and/or between grade levels.), however, this was qualified by more than one rater that some areas such as, records and youth leadership can not be taught just once within a school year. One general comment was that the "sequenced course outlines were generally weak in this area" (criterion three).

The majority of the panel agreed that criterion four (Problem areas for each year are appropriate for the intended grade level.) was difficult to rate. One panel member indicated that the sequenced course outlines for freshman and sophomore classes were "real obvious" because of basic core skills which are taught and another panel member indicated that there is "broad view" of production agriculture for these two grades. However, the junior and
senior classes were more difficult because "every teacher has different expertise and teaches what comes natural."

Another factor that made evaluation of criterion four more difficult, was the fact that the subjects were not required to include a title page for each year taught. Several panel members indicated that they could not determine the grade level of the sequenced course because there was no title page.

Criterion five (The overall selection of problem areas for the document is excellent.) received mixed responses from the three panel members. Two of the panel members indicated that they had greater experience in production agriculture than the taxonomy areas of horticulture, small animal care, and agricultural mechanics and thus evaluated the area of production agriculture more critically. Subjects in the experimental group were concentrating in agricultural production and the subjects in the control group were concentrating in horticulture, small animal care, agricultural business, and agricultural production. The third panel member indicated that evaluation of criterion five was based on the previous four criteria.

Criteria six through ten were judged by the panel as being easier to rate. The criteria (six through ten) by their nature were more subjective. One rater made no comments regarding criteria six through ten. Some of the
remarks in response to criteria six through ten were: (a) the copy was faint, (b) looked for the obvious, (c) indentations for each level (instructional topics, problem areas, and tasks), (d) 1 1/2 inch margins around document, and (e) readable. None of the panel members had any comments on the "Vocational Agriculture Outline Score Sheet" instrument or any suggestions on improving the instrument.

The experimental group had little control over the final results regarding the sequenced course outlines on criterion six [The document is legible (readable).], criterion seven (The document has adequate margins.) and criterion ten (Punctuation, grammar, and spelling are correct throughout the document.). The readability of the document (sequenced course outline) was a result of (a) the make or brand of printer and/or the printer ribbon quality, and (b) the researcher also made photocopies of the sequenced course outlines which were evaluated by the panel of experts. The software program had total control over the left and right margins (criterion seven) of the sequenced course outline, thus the experimental group could do little if anything regarding the left and right margins of the sequenced course outlines. The researcher typed in the data bases (instructional topics, problem areas, and tasks) and was totally responsible for the punctuation, grammar, and spelling contained therein. The subjects in the
experimental group without advanced computer literacy could not easily correct the punctuation, grammar, and spelling of the information contained in the data bases.

Conclusions

1. The microcomputer-managed sequenced course outline program was operational and performed at the specified level.

2. Students who used the microcomputer-managed sequenced course outline program "agreed" that the software program had utility and the panel of computer experts "strongly agreed" that the software program had utility.

3. The microcomputer-managed sequenced course outline program did not statistically reduce the time required to (a) plan, (b) type or computer entry, or (c) combined times of planning and typing or computer entry times.

4. Subjects who used the microcomputer-managed sequenced course outline program sequenced the same number of years as the control group.
5. The documents of the subjects who developed a sequenced course outline by traditional methods were rated higher on content than were the documents of the subjects who used the microcomputer-managed sequenced course outline program. The format quality of the sequenced course outlines developed by the control group was also rated significantly higher than that of the experimental group.

6. Upon further improvement in the microcomputer-managed sequenced course outline program, greater efficiencies in developing a sequenced course outline can be expected.

Recommendations

Development.

1. Further development of the instrument to evaluate the software program should be accomplished. Specifically, each of the subareas (design, video, content etc.) should be investigated to give directions for further development of the software program.
2. The researcher recommends that the microcomputer-managed sequenced course outline program be developed further to include additional functions that would assist a vocational agriculture teacher in developing a curriculum guide and/or an instructional guide. However, further development of the software program should be based on the results of a survey of selected vocational agriculture teachers. A survey to determine the program planning needs of vocational agriculture teachers.

3. The researcher recommends that before additional time and money is spent on further development of the software program a survey be conducted of selected vocational agriculture teachers to determine specific needs of a vocational agriculture teachers in regard to developing a curriculum/instructional guide.

4. Additional groups of specialists should be included in the evaluation phase of the microcomputer-managed sequenced course outline. The researcher used content experts and students (users) in this study, however, programmers and instructional designers should also be used to evaluate the software program to provide evaluation results that would result in greater generalizability.
Evaluation.

1. The researcher recommends that training be provided to the subjects, who will be using the software program, on use of the software program, the microcomputer, and a printer before sequencing a course outline.

2. A complete manual of instruction should be developed and evaluated before or concurrently with the evaluation of the software program.

3. Have all students use the same printer so that all the completed sequenced course outlines are of consistent quality.

4. Develop a training session for the panel of experts who will be scoring the completed sequenced course outlines and/or if possible to devise a more objective instrument.

5. Provide specific written instructions for the students so that they will understand exactly what is expected in developing a sequenced course outline.

6. Have all students complete their planning (selection of problem areas which are to be taught each year) prior to dividing the class into a control and an experimental group since there should be no difference in planning time between the two groups.
7. The software program should be evaluated by a larger group of subjects, specifically vocational agriculture teachers who need to develop, revise or update their course of study.

8. The researcher recommends that additional capabilities be included in the software program to assist vocational agriculture teachers in developing curriculum/instructional guides.

9. The researcher recommends that additional features and functions of the software program be included to meet the minimum requirements of the Ohio Department of Education.
APPENDIX A

COMPUTERS AND THEIR RELATIONSHIP TO PROGRAM AND CURRICULUM
Figure 1. Computers and their relationship to program and curriculum.
Figure 1.
Figure 2. Curriculum development model

Note. From "Process Model for Course of Study" by Ohio Department of Education, Columbus, Ohio, 1983, p. 16).
Figure 3. Curriculum cycle

Note. From "Process Model for Course of Study" by Ohio Department of Education, Columbus, Ohio, 1983, p. 17.
APPENDIX D

SUGGESTED USES OF A MICROCOMPUTER-MANAGED CURRICULUM PROGRAM
Figure 4. Suggested uses of a microcomputer-managed curriculum program.
APPENDIX E

SOFTWARE PROGRAM INPUT VARIABLES AND REPORTS
Figure 5. Software Program Input Variables and Reports.
APPENDIX F

COMPUTER-MANAGED SEQUENCED COURSE OUTLINE

PROGRAM REFERENCE MANUAL

175
Purposes of Software Program

The software program will perform two major functions. The first function will permit the user to add to and/or delete from the data base of instructional titles/units, problem areas and/or tasks. The second function will permit the user (a) to sequence problem areas and (b) to select task(s) before printing.
Table of Contents

Purposes of the program .............................................. 176
Screens ..................................................................... 178
Loading instructions .................................................... 180
Data base editing commands ....................................... 183
Curriculum screen editing commands ......................... 189
Printing the reports .................................................... 197
Problem area report ..................................................... 198
Hierarchical report ...................................................... 199
Summary of commands .................................................. 201
Quitting the program ................................................... 202
## List of Screens

<table>
<thead>
<tr>
<th>Screen</th>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Taxonomy database</td>
<td>180</td>
</tr>
<tr>
<td>2</td>
<td>Instructional units for agricultural production</td>
<td>181</td>
</tr>
<tr>
<td>3</td>
<td>Problem areas for crop production</td>
<td>182</td>
</tr>
<tr>
<td>4</td>
<td>Task list for planting the crop</td>
<td>182</td>
</tr>
<tr>
<td>5</td>
<td>Major instructional unit blank screen</td>
<td>183</td>
</tr>
<tr>
<td>6</td>
<td>Add screen</td>
<td>184</td>
</tr>
<tr>
<td>7</td>
<td>Add screen with new instructional unit</td>
<td>185</td>
</tr>
<tr>
<td>8</td>
<td>Major instructional unit screen with new topic</td>
<td>186</td>
</tr>
<tr>
<td>9</td>
<td>Add screen for a new problem area</td>
<td>187</td>
</tr>
<tr>
<td>10</td>
<td>Add screen for a new task</td>
<td>187</td>
</tr>
<tr>
<td>11</td>
<td>Delete screen message</td>
<td>188</td>
</tr>
<tr>
<td>12</td>
<td>Curriculum edit screen</td>
<td>190</td>
</tr>
<tr>
<td>13</td>
<td>File prompt screen</td>
<td>191</td>
</tr>
<tr>
<td>14</td>
<td>Curriculum screen with a selected problem area</td>
<td>191</td>
</tr>
<tr>
<td>15</td>
<td>Curriculum screen with the problem area added</td>
<td>192</td>
</tr>
<tr>
<td>16</td>
<td>Curriculum screen with a problem area selected to insert before the highlighted cursor</td>
<td>192</td>
</tr>
<tr>
<td>17</td>
<td>Curriculum screen with problem area inserted</td>
<td>193</td>
</tr>
<tr>
<td>18</td>
<td>Task list within the curriculum screen with all the &quot;o&quot; switches on</td>
<td>194</td>
</tr>
<tr>
<td>19</td>
<td>Task list within the curriculum screen with two &quot;o&quot; switches on</td>
<td>194</td>
</tr>
<tr>
<td>Screen</td>
<td>Topic</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>20</td>
<td>Screen prompt for saving a file</td>
<td>195</td>
</tr>
<tr>
<td>21</td>
<td>Screen prompt for changing a file name</td>
<td>195</td>
</tr>
<tr>
<td>22</td>
<td>Screen prompt for writing over a file</td>
<td>196</td>
</tr>
<tr>
<td>23</td>
<td>Report menu screen</td>
<td>197</td>
</tr>
</tbody>
</table>
Loading Instructions

Load DOS and place the Computer-managed Sequenced Course Outline disk in drive A and type "AG" (no quotation marks) to load the program.

After the program loads, the Taxonomy Menu Screen (see Screen 1) will be displayed. Choose the desired taxonomy by pressing the space bar to move highlighted cursor through the list. The highlighted cursor is represented in the documentation by a box, [__________]. Press the return <CR> key to load the associated data base for the selected taxonomy.

*************************************************************
|Curriculum Editor V1.13 |
| Developer: Ron Powell |
| (C) 1986 by Ben Kovitz |
*************************************************************

|Agricultural Production
Animal Production and Care
Agricultural Business, Supply, and Service
Agricultural-Industrial Equipment and Service
Agricultural Products Processing
Horticulture
Forestry
Agricultural Resources
Environmental Management

--------------<Choose Taxonomy Area>--------------

Screen 1. Taxonomy Data Bases.
The next menu that is displayed is the Major Instructional Unit Screen (see Screen 2). Choose a major instruction unit using the same procedure as in choosing the taxonomy, that is by pressing the space bar to move the highlighted cursor.

*INTRODUCTION TO SCHOOL & PROGRAM POLICIES*
*PERSONAL DEVELOPMENT*
*CROP PRODUCTION*
*LIVESTOCK PRODUCTION*
*AGRICULTURAL MECHANICS*
*FARM MANAGEMENT*

--------------<Choose Major Instructional Unit>-------------

Screen 2. Instructional Units for Agricultural Production.

Press the return key <CR> to see the list of problem(s) (see Screen 3) contained in the instructional unit.
Screen 3. Problem Areas for Crop Production.

To see the task list (see Screen 4) associated with a specific problem area, press the "T" key.

Screen 4. Task list for Planting the Crop.
The Major Instructional Unit Screen will display up to fourteen (14) choices; the Problem Area screen and the Task Screen will each display up to nineteen (19) choices. To return to a previous menu(s), press the ESCAPE key.

**Data Base Editing Commands**

Instructional units, problem areas and tasks may be easily added by pressing the "A" key. The following procedure may be used at any time to add an instructional unit, a problem area or a task to the data base.

A blank screen (see Screen 5) will appear if there are no instructional units, problem areas or tasks entered in the data base.

```
*-------------------------------------------------------------*
*                                                            *
*                                                            *
*                                                      I I   *
*                                                            *
*                                                            *
*  I I   |______________________________________________________I I   *
*                                                            *
*                                                            *
*                                                            *
*                                                            *
*                                                            *
*                                                            *
*-------------------------------------------------------------*

Screen 5. Major Instructional Unit Blank Screen.
By pressing the "A" key, the Add Screen (see Screen 6) will appear.

Screen 6. Add Screen.
A new instructional unit may now be entered in the database (see Screen 7).

---

**---<Choose Major Instructional Unit>---**

* Name of instructional unit: **LAB / FARM SAFETY PRACTICES**

---

Screen 7. Add Screen with New Instructional Unit.
Pressing the return key <CR> will "move" the new instructional unit to the Instructional Unit Menu Screen (see Screen 8)

Screen 8. Major Instructional Unit Screen with New Topic.
The "A" key in both the Problem Area Screen and the Task List Screen will prompt the user for a new problem area (see Screen 9) or a new task (see Screen 10).

Screen 9. Add Screen for a New Problem Area.

Screen 10. Add Screen for a New Task.
To delete an instructional unit, a problem area or a task move the highlighted cursor to the selected line and press the "D" key. A message will appear at the bottom of the screen, prompting the user for a response (see Screen 11) or the escape key may be pressed to return to the previous menu.

******************************************************************************
* |LAB / FARM SAFETY PRACTICES|
* *
* *
* *
* *
* *
* *
* *
* *<Choose Major Instructional Unit>---------
* Are you sure? Type y or n
* *
******************************************************************************

Screen 11. Delete Screen Message.

However, if an instructional unit or problem area is deleted, any list(s) contained under the selected item will be deleted (i.e., problem areas and tasks contained under the selected instructional topic, and task lists contained under the selected problem area).

New instructional units may be added to the data base if desired. When entering a new instructional unit and a new problem area the software program will automatically go
to the next lower level (i.e., from an instructional unit to a Problem Area Screen and from a Problem Area Screen to a Task List Screen.

The program has limited text editing capabilities. If data is added to the data base, make sure that the line of text entered is correctly typed before pressing the return <CR> key because a line of text is difficult to change once the return key is pressed. Many of the menu screens as well as the data bases are easier to change and/or correct through a word processor that will edit and save files in ASCII.

**Curriculum Screen Editing Commands**

The Curriculum Screen (see Screen 12) may be entered by (1) pressing the return key <CR> in the Problem Area Screen or (2) the "C" key. The program will prompt the user for a file name (see Screen 13). A file name must be entered! The program will not permit the use of the escape key to return to the Problem Area screen. If the curriculum screen was accidently entered, type in a file name and then once the curriculum screen appears, the escape key may then be used to return to a previous menu (instructional units or problem areas) If this is the first time that the Curriculum Editor is used, a file name of eight (8) characters and an extension of three (3) characters is permitted. The file
extension is NOT required! (Examples: Forestry.001 or VOAG-1). Do NOT begin a file name with a numeric or graphic character (i.e., 1, 2 or -, or =)! If a file has been previously saved, the old file name may be entered to access an existing file.


The Curriculum Edit Screen (see Screen 12) will hold a total of 38 problem areas, two columns of 19. The problem areas are truncated to accommodate the limitations of the screen; however, the problem areas will be printed correctly on the reports.
**Screen 13. File Prompt Screen.**

Additional commands used for the curriculum screen are:

1. As usual, the space bar moves the highlighted cursor.
2. Press the "A" key to add selected problem area (displayed at the bottom of screen) to the end of your list on the screen (see Screens 14 & 15)

**Screen 14. Curriculum Screen with Selected Problem Area.**
Screen 15. Curriculum Screen With Problem Area Added.

3. Press the "I" key to insert selected problem area immediately before the cursor (see Screens 16 & 17).

Screen 16. Curriculum Screen with a Problem Area Selected to Insert Before the Highlighted Cursor.
Screen 17. Curriculum Screen with Problem Area Inserted.

4. Press the "D" key to delete or move a problem area highlighted by the cursor. The "deleted" problem area will be displayed at the bottom of the screen and will become the new selection that can be moved in the sequenced list of problem areas by pressing the "A" or "I" key or deleted by allowing the problem area to remain at the bottom of the screen.

5. Press the "T" key to see the tasks listed (see Screen 18) for a specific problem area. There will be an "o" to the left of each task. The "o" functions as a "switch", that can be toggled on and off by pressing the return key <CR>. If the "o" is visible to the left of the task, that task will be printed on the hierarchial report. If the "o" is not visible (see Screen 19), then the task will not be listed on the hierarchial report.
Screen 18. Task List within the Curriculum Screen with all the "o" Switches On.

Screen 19. Task List within the Curriculum Screen with Two "o" Switches On.
6. A different file may be accessed by pressing the "F" key and the program will prompt with a message asking if the current file is to be saved before entering a new file name (see Screen 20). Type a "y" (Yes) or a "n" (No) in response to the prompt.

********************************************************************************
**                          **
**                          **
**                          **
**                          **
**                           Save (filename) before changing filename?  **
**                           **
**                           **
**                           **
**                           **
**                           **
********************************************************************************

Screen 20. Screen Prompt for Saving a File.

The program will then prompt for a new file name (Screen 21)

********************************************************************************
**                          **
**                          **
**                          **
**                          **
**                           Save (filename) before changing filename?  **
**                           **
**                           **
**                           **
**                           **
**                           New Filename: [__________________________]  **
**                           **
**                           **
********************************************************************************

Screen 21. Screen Prompt for Changing a File Name.
If a file already exists with the new file name, the program will allow the old file to be written over (see Screen 22) or permits the user to return to the Curriculum Screen (see Screen 16) by typing a "n".

Screen 22. Screen Prompt for Writing Over a File.

The problem areas may be sequenced by two methods. The first method is to select the problem areas in the order in which they will be taught and the second method is to reorder the problem areas after they have been selected and moved to the Curriculum Screen.
Printing the Reports

Any IBM compatible printer will work with the software program. The printer port is LPT1. The report menu (see Screen 23) is accessed by pressing the "P" key in the curriculum editor mode. The report menu screen permits a choice of two (2) reports. Specifically, (1) a list of sequenced problem areas (see Report 1) and (2) a hierarchial listing of instructional units, problem areas and tasks (see Report 2). Choose the selected report by pressing the space bar to move the highlighted cursor and then pressing the return key. The screen will prompt with a message to turn on the printer.

Screen 23. Report Menu Screen.
Report 1

Problem Area Report

1. DEVELOPING AWARENESS OF POLICIES
2. PLANTING THE CROP
3. SECURING CHAPTER MEMBERSHIP
4. DEVELOPING THE INDIVIDUAL
5. USING SMALL ENGINES
6. DEVELOPING COOPERATION
7. MILKING DAIRY ANIMALS
8. SHOWING LIVESTOCK
9. GETTING ESTABLISHED IN A FARM BUSINESS
10. USING LAWN AND GARDEN POWER EQUIPMENT
11. WELDING METAL AND METAL ALLOYS
12. DEVELOPING LEADERSHIP
Report 2
Hierarchical Report

INTRODUCTION TO SCHOOL & PROGRAM POLICIES

DEVELOPING AWARENESS OF POLICIES

DESCRIBE OVERALL SCHOOL POLICIES
DESCRIBE CLASSROOM POLICIES
DESCRIBE LABORATORY POLICIES
DESCRIBE POLICIES IN NONSCHOOL SETTINGS
DESCRIBE SCHOOL POLICY - JOB PLACEMENT EXPERIENCE

CROP PRODUCTION

PLANTING THE CROP

SELECT CROP / SEED AND VARIETY
MAINTAIN VIABLE SEEDS
CALIBRATE AND OPERATE THE PLANTER

PERSONAL DEVELOPMENT

SECURING CHAPTER MEMBERSHIP

LIST REASONS FOR MEMBERSHIP

DEVELOPING THE INDIVIDUAL

DEMONSTRATE THE TRAITS OF PERSONAL INTEGRITY
DEVELOP POSITIVE ATTITUDES

AGRICULTURAL MECHANICS

USING SMALL ENGINES

OPERATE SMALL ENGINES
MAINTAIN SMALL ENGINES

PERSONAL DEVELOPMENT

DEVELOPING COOPERATION

DESCRIBE BASIC NEEDS OF INDIVIDUALS
DEMONSTRATE SENSITIVITY TO THE NEEDS OF OTHERS
DEMONSTRATE WORKING COOPERATIVELY WITH OTHERS
LIVESTOCK PRODUCTION

MILKING DAIRY ANIMALS
- DETERMINE FACILITIES AND EQUIPMENT
- KEEP DAIRY RECORDS

SHOWING LIVESTOCK
- TRAIN ANIMALS FOR SHOW
- FIT AND GROOM ANIMALS FOR SHOW

FARM MANAGEMENT

GETTING ESTABLISHED IN A FARM BUSINESS
- DETERMINE LABOR REQUIREMENTS
- DEVELOP GOALS FOR ACQUISITION OF A FARM BUSINESS

AGRICULTURAL MECHANICS

USING LAWN AND GARDEN POWER EQUIPMENT
- MAINTAIN LAWN AND GARDEN POWER EQUIPMENT
- OPERATE LAWN AND GARDEN POWER EQUIPMENT
- TROUBLE-SHOOT LAWN AND GARDEN POWER EQUIPMENT

WELDING METAL AND METAL ALLOYS
- USE THE ELECTRIC ARC WELDER (AC-DC)
- USE THE OXY-ACETYLENE WELDER
- USE THE ARC AND INERT GAS WELDER (MIG-TIG)

PERSONAL DEVELOPMENT

DEVELOPING LEADERSHIP
- DEMONSTRATE CORRECT PARLIAMENTARY PROCEDURE
- SERVE AS A WORKING MEMBER ON A COMMITTEE
- DESCRIBE THE CHARACTERISTICS OF A FFA OFFICER
SUMMARY OF COMMANDS

Data Base Editing Commands

A key.......Add a new entry to the data base
D key.......Delete an entry from the data base
Enter key....Load a data base

......Access a list of problem areas

......Capture a problem area/proceed to the curriculum screen

Esc key.....Return to a previous menu and save changes made to the data base

Space bar....Moves the highlighted cursor

T key.......Access a task list

Curriculum Screen Editing Commands

A key.......Add a problem area to bottom of curriculum screen list
C key.......Access the curriculum screen
D key.......Delete the highlighted problem area from the curriculum screen
Enter Key....Capture a problem area/proceed to the curriculum screen

......Toggle the tasks on or off

Esc key.....Return to the previous problem area screen

F key.......Change to a data base file previously saved

I key.......Insert a problem area above the highlighted cursor

P key.......Access the report menu

T key.......Access a task list
Quitting the Program

ALL files, additions and/or deletions are automatically saved by backing out of the software program by pressing the escape key. To go back in the program at any place, that is, from curriculum screen to problem area screen, task screen to problem area screen, problem area screen to instructional unit screen, instructional unit screen to taxonomy screen or from taxonomy screen to DOS, use the escape key.
APPENDIX G
AG.C PROGRAM MODULE
Ag.c Program Module

/* ag.c - source module 1 of 15 */
* Other modules:
*  agunit.c Instructional unit menu
*  agprob.c Problem area menu
*  agskill.c Skill area (task) menu
*  agcur.c Curriculum menu
*  agread.c Subroutines to read the various data files
*  agsave.c Subroutines to save the various data files
*  agdel.c Deletion subroutines
*  agaccess.c Routines to access arrays with id#s, not indices
*  agprint.c Text formatting for printer output
*  agmisc.c Miscellaneous functions
*  agextern.c Global variable declarations
*  textgr.asm Basic module of TEXTGR library
*  tgfill.asm Rectangular fill
*  tgattrib.asm Changes screen attributes
*  tgborder.asm Draws rectangular borders
*  tglines.asm Draws horizontal and vertical lines
*  tgtext.asm Directly writes text to screen (fast)
*  tgmenu.c Displays menu and takes order
*  tgmisc.asm Miscellaneous subroutines for TEXTGR
*  tginput.c String input from console
*  tgchar.asm Directly writes single character to screen
*  textgr.h Header file for text graphics subroutines
*  agconst.h Constants
*  ag.h extern declarations, #includes agconst.h, etc.
*  ag Main make file
*  textgr Make file for TEXTGR; called by ag make file
*
* Note: all modules beginning with "tg" and "textgr" are part of the TEXTGR text graphics library. Filenames without extensions are make files for use with Microsoft make V1.00.
*
* In addition, compilation requires Lattice C V2.01. Program is written to work under PC-DOS V2.0 and higher.
* V1.02 Last edited by Ben Kovitz 04 Feb 86.
* */

#include <ag.h>

char *getml();

main()
{
    static FILE *tfp, *fp;
    static char taxfile[MAXTAX][FNLEN + 1]; /* Taxonomy area filenames */
    static char *taxmenu[MAXTAX + 1];
    static unsigned int taxarea;
    static unsigned int i, j;
    static char c, s[MAXLINE], t[MAXLINE];

    if ((putchar('a'), (textl = getml(4096L)) == NULL) ||
        (putchar('b'), (text2 = getml(30000L)) == NULL) ||
        (putchar('c'), (iu = (struct IUSTRUC *)
            getml((long)MAXIU * sizeof(struct IUSTRUC))) ==
            NULL) ||
        (putchar('d'), (pr = (struct PRSTRUC *)
            getml((long)MAXPR * sizeof(struct PRSTRUC))) ==
            NULL) ||
        (putchar('e'), (sk = (struct SKSTRUC *)
            getml((long)MAXSK * sizeof(struct SKSTRUC))) ==
            NULL) ||
        (putchar('f'), (cur = (struct CURSTRUC *)
            getml((long)MAXCUR * sizeof(struct CURSTRUC))) ==
            NULL)) {
        printf("ag: insufficient memory");
        exit(5);
    }

    restart:
    ptext1 = text1; /* So they're NOT the most mnemonic variable */
    ptext2 = text2; /* names ever conceived! Who asked you anyway? */
    *curfile = '\0';

    if ((tfp = fopen("taxonomy.dat", "r")) == NULL) {
        cls();
        puts("\nTAXONOMY.DAT missing.");
        exit(100);
    }

    for (i = 0; i != MAXTAX; i++) {
        if (fgets(s, MAXLINE, tfp) == NULL) {
            continue;
        }
        // Process line...
    }
}
taxarea = --i;
break;
}
midstr(taxfile[i], s, 0, FNLEN - 1);
chopspace(taxfile[i]);
if (*s)
    s[strlen(s) - 1] = '\0';
strcpy(ptextl, s + FNLEN);
taxmenu[i] = ptextl;
ptextl += strlen(s + FNLEN) + 2;
} fclose(tfp);
taxmenu[++i] = nullstr;

for ( ; ; ) {
    clrcur();
    cls();
    hline(0, 0, 79);
    border(26, 0, 52, 4, 2);
    text(28, 1, "Curriculum Editor V1.13");
    text(28, 2, "  Developer; Ron Powell");
    text(28, 3, "(C) 1986 by Ben Kovitz");
    bottom("Choose Taxonomy Area");
    c = menu("AaDd\015\033", 65, 1, 8, 6, taxmenu, &j);
    switch (toupper(c)) {
    case '\033': /* Escape — exit program */
        cls();
        putchar('\n');
        exit(0);
        case 'A': /* Add a new taxonomy area */
        bottom("Add New Taxonomy Area");
        input(0, 22, "Taxonomy Name: ", ptext1, MAXLINE);
        if (*ptext1 == '\0')
            continue;
        ptext2 = ptext1 + strlen(ptext1) + 2;
        input(0, 23, "Filename: ", ptext2, 63);
        if (*ptext2 == '\0')
            continue;
        if (((fp = fopen(ptext2, "r")) != NULL) {
            fclose(fp);
            sprintf(s, "%s already exists.", ptext2);
            text(25, 23, s);
            waitkey();
            continue;
        }
        tfp = fopen("taxonomy.dat", "a");
padto(ptext2, ptext2, FNLEN);
        sprintf(s, "%s\n", ptext2, ptext1);
        fputs(s, tfp);
        fclose(tfp);
goto restart;
case '\015':    /* Open highlighted taxonomy
area */
    if (readtax(taxfile[j]))
        break;
    unitscrn();
    if (dchange)    /* If database was modified, save
it */
        savetax(taxfile[j]);
    if (cchange)    /* If curriculum was modified,
save it too */
        savecur();
    break;
}
APPENDIX H

AGREAD.C PROGRAM MODULE
Agread.c Program Module

/*
 agread.c - Subroutines to read the various data files for
 ag.exe
 *
 * readtax() Reads in a taxonomy data file
 * readcur() Reads in a curriculum data file
 * parse() Parses individual lines in data files (local
 * to this file)
 *
 * Last edited 04 Feb 86 by Ben Kovitz.
 *
 */

#include <ag.h>

char *stptok();

readtax(taxfile)
char *taxfile;
{
    static unsigned i, n, m, o;
    static FILE *fp;
    static char s[MAXLINE];

    npr = nsk = niu = nidiu = 0;
    if ((fp = fopen(taxfile, "r")) == NULL) {
        if ((fp = fopen(taxfile, "w")) == NULL) {
            sprintf(s, "Can't open %s.", taxfile);
            text(25, 23, s);
            waitkey();
            return(-1);
        }
        fclose(fp);
        return(0);
    }
    ptext1 = text2;
    i = 1;
    if (fgets(s, MAXLINE, fp) == NULL) {
        fclose(fp);
        return(0);
    }
    sscanf(s, "%d", &nidiu);
    while (i++, fgets(s, MAXLINE, fp) != NULL) {
        switch (toupper(*s)) {
        case 'U':
            if (parse(s + 1, &n, &m, &o, ptext1)) {
                fclose(fp);
            }
            break;
        case 'V':
            if (parse(s + 1, &n, &m, &o, ptext1)) {
                fclose(fp);
            }
            break;
        case 'W':
            if (parse(s + 1, &n, &m, &o, ptext1)) {
                fclose(fp);
            }
            break;
        case 'X':
            if (parse(s + 1, &n, &m, &o, ptext1)) {
                fclose(fp);
            }
            break;
        case 'Y':
            if (parse(s + 1, &n, &m, &o, ptext1)) {
                fclose(fp);
            }
            break;
        case 'Z':
            if (parse(s + 1, &n, &m, &o, ptext1)) {
                fclose(fp);
            }
            break;
        }
    }
    return(0);
}
sprintf(s, "Error at line %d.", i);
text(25, 23, s);
waitkey();
return(-1);
}
iu[niu].id = n;
iu[niu].nid = m;
iu[niu].name = ptextl;
niu++;
ptextl += strlen(ptextl) + 2;
break;
case 'P':
  if (parse(s + 1, &n, &m, &o, ptextl)) {
    fclose(fp);
    sprintf(s, "Error at line %d.", i);
text(25, 23, s);
    waitkey();
    return(-1);
  }
  pr[npr].id = n;
  pr[npr].iu = m;
  pr[npr].nid = o;
  pr[npr].name = ptextl;
  npr++;
  ptextl += strlen(ptextl) + 2;
  break;
case 'S':
  if (parse(s + 1, &n, &m, &o, ptextl)) {
    fclose(fp);
    sprintf(s, "Error at line %d.", i);
text(25, 23, s);
    waitkey();
    return(-1);
  }
  sk[nsk].id = n;
  sk[nsk].pr = m;
  sk[nsk].iu = o;
  sk[nsk].name = ptextl;
  nsk++;
  ptextl += strlen(ptextl) + 2;
  break;
default:
  fclose(fp);
  sprintf(s, "Error at line %d.", i);
text(25, 23, s);
  waitkey();
  return(-1);
}
fclose(fp);
readcur() /* Returns 1 if error in file, -1 if can't create file, */
{
    static FILE *fp;
    static char s[255], t[255], *u, *v;
    static int n, m;
    static int i;
    if ((fp = fopen(curfile, "r")) == NULL) {
        if ((fp = fopen(curfile, "w")) == NULL) {
            sprintf(s, "Can't create %s.", curfile);
            text(25, 23, s);
            waitkey();
            return(-1);
        }
    }
    fclose(fp);
    return(0);
}
clrcur();
while (fgets(s, 255, fp) != NULL) {
    switch (toupper(*s)) {
    case 'P':
        if (parse(s + 1, &cur[ncur].iu, &cur[ncur].pr,
                   &cur[ncur].wks, t)) {
            fclose(fp);
            sprintf(s, "Error at line %d.", ncur);
            text(25, 23, s);
            clrcur();
            waitkey();
            return(1);
        }
        for (i = 0, u = t + 1; ; i++) {
            if (*u == '\0')
                break;
            u = stpblk(u);
            if (*u == '\0')
                break;
            u = stptok(u, v, 255, " ");
            if (*v == '\0')
                break;
/*
             strcat(v, " ");*/
            stcd_i(v, &cur[ncur].sk[i]);
        }
        cur[ncur].sk[i] == -1;
        ncur++;
break;
    case 'M':
        if (parse(s + 1, &sdate, &n, &m, t)) {
            fclose(fp);
            sprintf(s, "Error at line %d.", ncur);
            text(25, 23, s);
            clrscr();
            waitkey();
            return(1);
        }
        strcpy(curtitle, t + 1);
        break;
    }
    fclose(fp);
    return(0);
}

parse(s, n, m, o, t)
char *s, *t;
int *n, *m, *o;
{
    static char ns[MAXLINE], ms[MAXLINE], os[MAXLINE];
    static char *p;

    p = 1 + stptok(s, ns, MAXLINE, ",\n");
    if (strlen(ns) == 0)
        return(-1);
    p = 1 + stptok(p, ms, MAXLINE, ",\n");
    if (strlen(ms) == 0)
        return(-1);
    p = 1 + stptok(p, os, MAXLINE, ",\n");
    if (strlen(os) == 0)
        return(-1);
    p = 1 + stptok(p, t, MAXLINE, ",\n");
    if (strlen(t) == 0)
        return(-1);
    /* strcat(ns, "\n");
    strcat(ms, "\n");
    strcat(os, "\n");  */
    stcd_i(ns, n);
    stcd_i(ms, m);
    stcd_i(os, o);
    return(0);
}
ASSIGNMENT #2

Using your census data, develop a sequenced course outline for the vocational agriculture program. The course outline should identify the major instructional units, problem areas, and tasks you plan to teach over a four-year period. Use the attached example to guide your work.
Assignment #2

Vocational Agriculture
Course Outline

I. Introduction to School and Program

A. Developing an awareness of school and program policies.
   1. Describe overall school policies
   2. Describe classroom policies
   3. Describe shop policies
   4. Describe policies in non-school settings

II. Personal Development/Leadership

A. Securing chapter membership in the FFA
   1. List reasons for membership
   2. Describe when and where the FFA was organized
   3. Describe how the local FFA is organized
   4. Describe the benefits of being a member of the local chapter

B. Becoming established in agricultural careers
   1. Analyze agricultural career opportunities
   2. Determine preparation requirements for specified agricultural careers
   3. Develop career goals and objectives
   4. Develop a plan for reaching chosen career
   5. Locate job opportunities

III. Crop Production

A. Conserving soil
   1. Select management practices
   2. Determine cropping system
   3. Determine plant nutrient requirements
   4. Determine kinds and application rates of fertilizer

B. Preparing the seedbed
   1. Select tillage systems

C. Planting the crop
   1. Select crop, seed, and variety
   2. Select time of planting, depth and rate of planting, and fertilizer placement

D. Controlling pests
   1. Control insect pests
   2. Control weeds
   3. Control disease
IV. Livestock Production

A. Identifying and selecting livestock
   1. Identify livestock breeds
   2. Select a species
   3. Select livestock compatible to the farming program

V. Agricultural Mechanics

A. Using hand and power tools
   1. Use and maintain hand tools
   2. Use and maintain power tools

B. Planning and constructing farm tools and equipment
   1. Prepare a blueprint of construction projects
   2. Prepare a bill of materials and secure materials
   3. Construct farm tools or equipment

C. Working with cold metal
   1. Identify metals
   2. Cut threads
   3. Fabricate cold metal
Agr Educ 585  Instructional Program Planning for Vocational Agriculture

Spring Quarter  Janet L. Henderson
246 Ag Admin Bldg.  204 Ag Admin Bldg.
T R 1-2:15 pm  422-6671

Course Description:

Principles and procedures used in planning the vocational agriculture curriculum with an emphasis upon supervised occupational experience programs for high school students.

Course Objectives:

1. Identify and select the content for a vocational agriculture curriculum.
2. Sequence course content according to selected criteria.
3. Discuss the importance of a local advisory committee in program planning.
4. Review extended service activities to efficiently use time during summer months.
5. Identify principles and procedures related to the development of individual Supervised Occupational Experience Programs.
6. Identify the components of the Ohio recordkeeping system.
Course Assignments:

| Assignment                                                                 | Due Date
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Analysis of Local Ag Situation</td>
<td>April 10</td>
</tr>
<tr>
<td>#2 Sequenced Course Outlines - List of Instructional Units and Problem Areas</td>
<td>May 8</td>
</tr>
<tr>
<td>#3 Advisory Committee Meeting</td>
<td>May 8</td>
</tr>
<tr>
<td>#4 Ag Ed Magazine - SOE Programs</td>
<td>May 15</td>
</tr>
<tr>
<td>#5 Ag Ed Magazine - Summer Programs</td>
<td>May 20</td>
</tr>
<tr>
<td>#6 Ag Ed Magazine Article - Future Programs</td>
<td>June 10</td>
</tr>
</tbody>
</table>

Work is due on the date specified. Late work will be penalized 5% per day for each school day missed. All assignments should be typed, double spaced.

Grading Procedures:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Census Analysis</td>
<td>10</td>
</tr>
<tr>
<td>Sequenced Course Outlines</td>
<td>30</td>
</tr>
<tr>
<td>Advisory Committee Meeting</td>
<td>10</td>
</tr>
<tr>
<td>Ag Ed Magazine Article</td>
<td>5</td>
</tr>
<tr>
<td>Ag Ed Magazine Article</td>
<td>5</td>
</tr>
<tr>
<td>Quiz #1</td>
<td>5</td>
</tr>
<tr>
<td>Quiz #2</td>
<td>5</td>
</tr>
<tr>
<td>Midterm</td>
<td>10</td>
</tr>
<tr>
<td>Final Exam - (Includes Ag Ed Magazine Article)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

Grades will be determined as follows:

A = 100 - 93%  
A- = 92 - 90%  
B+ = 89 - 87%  
B = 86 - 83%   
B- = 82 - 80%   
C+ = 79 - 77%  
C = 76 - 73%  
C- = 72 - 70%  
D+ = 69 - 67%  
D = 66 - 63%  
E = less than 63%
## AGR EDUC 585

### Course Calendar

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 1</td>
<td>Introductions; review course syllabus; discuss the sequence of Agr Edu 585 in the preservice teacher ed curriculum</td>
</tr>
<tr>
<td>April 3</td>
<td>Why plan for instruction? Identifying steps in the program planning process; explain Assignment #1</td>
</tr>
<tr>
<td>April 8</td>
<td>Assessing the local situation; where are we?; work on Assignment #1 in small groups</td>
</tr>
<tr>
<td>April 10</td>
<td>Review Assignment #1 using worksheet; identifying other factors influencing selection of course content</td>
</tr>
<tr>
<td>April 15</td>
<td>Where do we want to go? Establishing general and specific course objectives</td>
</tr>
<tr>
<td>April 17</td>
<td>Quiz #1; review quiz</td>
</tr>
<tr>
<td>April 22</td>
<td>Identifying factors that influence the sequencing of course content</td>
</tr>
<tr>
<td>April 24</td>
<td>Developing local courses of study</td>
</tr>
<tr>
<td>April 29</td>
<td>Utilizing the local advisory committee in developing the vo-ag program</td>
</tr>
<tr>
<td>May 1</td>
<td>Midterm; review midterm</td>
</tr>
<tr>
<td>May 6</td>
<td>Planning the summer program</td>
</tr>
<tr>
<td>May 8</td>
<td>Presenting course outlines to local advisory committee</td>
</tr>
<tr>
<td>May 13</td>
<td>Defining SOE and identifying types of SOE in Ohio; benefits of SOE</td>
</tr>
<tr>
<td>May 15</td>
<td>Teacher responsibilities for SOE - Inform, Plan, Supervise</td>
</tr>
<tr>
<td>May 20</td>
<td>Quiz #2; review quiz</td>
</tr>
<tr>
<td>May 22</td>
<td>Identifying the components of The Ohio Recordkeeping System</td>
</tr>
<tr>
<td>May 27</td>
<td>Using the computer for SOE recordkeeping</td>
</tr>
<tr>
<td>May 29</td>
<td>State Supervisor - state staff responsibilities and state SOE reports</td>
</tr>
<tr>
<td>June 3</td>
<td>Beginning Teacher Panel; day class cancelled; late afternoon session scheduled for 2 hrs</td>
</tr>
<tr>
<td>June 5</td>
<td>Course Summary and Review</td>
</tr>
<tr>
<td>June 10</td>
<td>Final Exam 3:00 - 4:48 pm</td>
</tr>
</tbody>
</table>
**Suggested Teaching Materials**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Teacher Guide for Vocational Agriculture Record Keeping System</td>
<td>5.00</td>
</tr>
<tr>
<td>2. General Record Book</td>
<td>1.00</td>
</tr>
<tr>
<td>3. School Laboratory Record Book</td>
<td>1.00</td>
</tr>
<tr>
<td>4. Job Placement Record Book</td>
<td>0.80</td>
</tr>
<tr>
<td>5. Improvement Project Record Book</td>
<td>0.15</td>
</tr>
<tr>
<td>6. Proficiency Record of Occupational Tasks</td>
<td>$1.20 to $1.60</td>
</tr>
<tr>
<td>7. Plant Enterprise Record Book</td>
<td>0.75</td>
</tr>
<tr>
<td>8. Animal Enterprise Record Book</td>
<td>1.15</td>
</tr>
<tr>
<td>9. Business Account Book</td>
<td>2.00</td>
</tr>
<tr>
<td>10. Ohio Livestock Enterprise Budgets</td>
<td>1.00</td>
</tr>
<tr>
<td>11. Ohio Crop Enterprise Budgets</td>
<td>1.25</td>
</tr>
</tbody>
</table>

*Available from Curriculum Materials Service, Rm 254, Ag Admin Bldg*
APPENDIX K

"ATTITUDE TOWARD MICROCOMPUTERS" INSTRUMENT
ATTITUDE TOWARD MICROCOMPUTERS

Below are several statements about microcomputers. Please read each statement and then indicate the degree to which you agree or disagree with the statement according to the following scale:

VSD — VERY STRONGLY DISAGREE....I very strongly disagree with the statement.
SD — STRONGLY DISAGREE..........I strongly disagree with the statement.
D — DISAGREE...................I disagree with the statement.
A — AGREE.....................I agree with the statement.
SA — STRONGLY AGREE..........I strongly agree with the statement.
VSA — VERY STRONGLY AGREE....I very strongly agree with the statement.

CIRCLE YOUR RESPONSE

1. Microcomputers do not have a place in my future...................VSD SD D A SA VSA
2. Microcomputers can be used to increase student learning..................VSD SD D A SA VSA
3. I feel comfortable talking about microcomputer uses........................VSD SD D A SA VSA
4. I feel comfortable using microcomputers....................VSD SD D A SA VSA
5. I feel uncomfortable "powering-up" a microcomputer..........................VSD SD D A SA VSA
6. Taking a test on a microcomputer would not lower my performance..........VSD SD D A SA VSA
7. I feel comfortable using "canned" (ready to run) programs than developing (programming) my own programs...................VSD SD D A SA VSA
8. Microcomputers make too many errors for me to trust them..................VSD SD D A SA VSA
9. Microcomputers are primarily for agricultural production and/or agricultural business and have limited use in other areas of vocational agriculture......................VSD SD D A SA VSA
10. Microcomputers will increase my work load....................VSD SD D A SA VSA
11. Microcomputers will not become a major part of my job responsibilities in the foreseeable future.

12. Microcomputers should be operated primarily by the secretarial staff and not by agricultural teachers.

13. Microcomputers are primarily for those teachers who are computer literate.

14. Microcomputers can perform many functions for a teacher that are currently being done manually.

15. For the most part, microcomputers can be considered a "passing fad".

16. There is limited use for microcomputers in vocational agriculture.

17. Vocational agriculture students should be taught how to use the microcomputer as a tool to assist them in decision making.

18. I feel confident teaching students to use a microcomputer.

19. Teaching the use of microcomputers to students will require much time on my part.

20. I feel that computers should not be in the vocational agriculture classrooms.

21. I feel that vocational agriculture teachers should be competent in using microcomputers.

22. All vocational agriculture teachers should subscribe to a computer magazine.

23. All vocational agriculture teachers should be required to receive microcomputer inservice training.

24. I feel that vocational agriculture teachers should be literate in using microcomputers.
APPENDIX L

"SOFTWARE EVALUATION" INSTRUMENT
SOFTWARE EVALUATION

Below are several statements about microcomputers. Please read each statement and then indicate the degree to which you agree or disagree with the statement according to the following scale:

VSD -- VERY STRONGLY DISAGREE....I very strongly disagree with the statement.
SD -- STRONGLY DISAGREE........I strongly disagree with the statement.
D -- DISAGREE....................I disagree with the statement.
A -- AGREE......................I agree with the statement.
SA -- STRONGLY AGREE..........I strongly agree with the statement.
VSA -- VERY STRONGLY AGREE.....I very strongly agree with the statement.

Quality and Value

CIRCLE YOUR RESPONSE

1. The use of a microcomputer for curriculum planning was a significant advance in technology.................................VSD SD D A SA VSA

2. The software program met the requirements of Ag. Ed. 585............................VSD SD D A SA VSA

3. The software program allowed flexibility in developing my sequenced course of study........................................VSD SD D A SA VSA

4. The software program was not easy to use..................................VSD SD D A SA VSA

5. The software program helped me optimize the use of my time......................VSD SD D A SA VSA

6. The style of presentation of the computer program was not appropriate for the development of a sequenced course outline.................................VSD SD D A SA VSA

7. I enjoyed developing my curriculum enough to be willing to use the program again.................................VSD SD D A SA VSA

Design Considerations

8. Software objectives appeared to be based on the real needs of the user.............VSD SD D A SA VSA
9. Objectives and purposes for the software program were not clearly stated.

10. The program effectively challenges teacher creativity.

11. Use of the software program was motivating.

12. There were errors that made this software frustrating to use.

If you agree with Question 12, please explain what is frustrating you.

13. The program was relatively bug free (no technical problems).

14. This program was not suitable for the intended purposes.

15. The various skill levels of users were adequately addressed and handled.

16. The user does not have enough control over the rate and sequence of presentation and review.

17. Avenues for review were provided and placed under the user's control.

18. Program instructions were not easy to follow.

19. Use of the program required minimal assistance.

20. Users can access the program menu(s) to change activities.

21. Users can enter or exit the program as desired.

22. Cues and prompts were provided so the user can respond correctly.

23. The commands were not easily remembered.

24. Corrections were easy to make.
25. The program moved from operation to operation efficiently..................VSD SD D A SA VSA
26. The program does not achieve its intended purpose.........................VSD SD D A SA VSA
27. The program allowed easy manipulation of the information in the data files..............VSD SD D A SA VSA
28. The program worked with no observable error conditions.......................VSD SD D A SA VSA
29. The program achieved the stated objectives.VSD SD D A SA VSA

Video

30. The text that appeared on the video screen was easy to read (legible & attractive)...............VSD SD D A SA VSA
31. Screen formatting (layout/organization) was poorly handled..................VSD SD D A SA VSA
32. Transitions between video sequences were not distracting................VSD SD D A SA VSA
33. The screen format was neat and uncluttered.VSD SD D A SA VSA

Content

34. The content was not accurate..................VSD SD D A SA VSA
35. The content was current and timely..........VSD SD D A SA VSA
36. The content was not clearly presented.....VSD SD D A SA VSA
37. The software program utilized the unique capabilities of the microcomputer to assist the user in developing a course outline....VSD SD D A SA VSA
38. The program was free of spelling and grammatical errors............VSD SD D A SA VSA

Software Evaluation Summary

39. I would not recommend the software program to other teachers.................VSD SD D A SA VSA
40. This software program was an effective use of microcomputers for teachers.............VSD SD D A SA VSA
41. This software program was not an appropriate use of microcomputers for teachers.

42. Identify the strengths of the software program. (What did you like best about the software program)

43. Identify the weaknesses of the software program. (What did you like least about the software program)

44. What changes in the software program would you recommend?
APPENDIX M

"TIME LOG"
TIME REQUIREMENTS

PLEASE ANSWER ALL QUESTIONS

(1) I prepared a sequenced course outline for:
   2 years ___.
   4 years ___.
   Other ___.

(2) Identify the method used to develop your sequenced
    course of study:  Traditional    Computer

LOG OF TIME TO COMPLETE SEQUENCED COURSE OF STUDY ASSIGNMENT
FOR AG. ED. 585 (PLEASE STUDY THE ATTACHED EXAMPLE BEFORE BEGINNING).

<table>
<thead>
<tr>
<th>OUT OF CLASS TIME</th>
<th>DESCRIPTION OF ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX N

EXAMPLES OF "TIME LOG"
TIME REQUIREMENTS

PLEASE ANSWER ALL QUESTIONS

(1) I prepared a sequenced course outline for:
   2 years ___.
   4 years ___.
   Other ___.

(2) Identify the method used to develop your sequenced course of study: Traditional Computer

LOG OF TIME TO COMPLETE SEQUENCED COURSE OF STUDY ASSIGNMENT
FOR AG. ED. 585 (please study the attached example before beginning).

<table>
<thead>
<tr>
<th>OUT OF CLASS TIME</th>
<th>DESCRIPTION OF ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30/10:45</td>
<td>Review county and community data</td>
</tr>
<tr>
<td>10:45/11:15</td>
<td>Review record book for specific taxonomy</td>
</tr>
<tr>
<td>11:15/11:45</td>
<td>Select instructional topics</td>
</tr>
<tr>
<td>11:45/12:15</td>
<td>Select problem areas to teach</td>
</tr>
<tr>
<td>1:30/2:00</td>
<td>Select tasks</td>
</tr>
<tr>
<td>2:00/2:10</td>
<td>Review draft</td>
</tr>
<tr>
<td>4:00/4:15</td>
<td>Review draft of units/problems/tasks</td>
</tr>
<tr>
<td>4:15/4:45</td>
<td>Sequence problem areas</td>
</tr>
<tr>
<td>4:45/5:05</td>
<td>Review sequenced problems, add units and tasks</td>
</tr>
<tr>
<td>5:05/5:30</td>
<td>Review and make correction of draft</td>
</tr>
<tr>
<td>6:30/10:00</td>
<td>Type first draft for VoAg I</td>
</tr>
<tr>
<td>10:00/10:15</td>
<td>Retype page 3</td>
</tr>
<tr>
<td>10:15/11:30</td>
<td>Type first draft for VoAg II</td>
</tr>
<tr>
<td>1:00/2:07</td>
<td>Type first draft for VoAg III</td>
</tr>
<tr>
<td>2:07/3:23</td>
<td>Type first draft for VoAg IV</td>
</tr>
<tr>
<td>3:23/3:38</td>
<td>Retype page 1 for VoAg III</td>
</tr>
</tbody>
</table>

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------
TIME REQUIREMENTS

PLEASE ANSWER ALL QUESTIONS

(1) I prepared a sequenced course outline for:
   2 years ___.
   4 years ___.
   Other ___.

(2) Identify the method used to develop your sequenced course of study: Traditional Computer

LOG OF TIME TO COMPLETE SEQUENCED COURSE OF STUDY ASSIGNMENT FOR AG. ED. 595 (please study the attached example before beginning).

<table>
<thead>
<tr>
<th>OUT OF CLASS TIME</th>
<th>DESCRIPTION OF ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30/10:45</td>
<td>Review county and community data</td>
</tr>
<tr>
<td>10:45/11:15</td>
<td>Review record book for specific taxonomy</td>
</tr>
<tr>
<td>11:15/11:45</td>
<td>Select instructional topics</td>
</tr>
<tr>
<td>11:45/12:15</td>
<td>Select problem areas to teach</td>
</tr>
<tr>
<td>1:30/2:00</td>
<td>Select tasks</td>
</tr>
<tr>
<td>2:00/2:10</td>
<td>Review draft</td>
</tr>
<tr>
<td>4:00/4:15</td>
<td>Review draft of units/problems/tasks</td>
</tr>
<tr>
<td>4:15/4:45</td>
<td>Sequence problem areas</td>
</tr>
<tr>
<td>4:45/5:05</td>
<td>Review sequenced problems, add units and tasks</td>
</tr>
<tr>
<td>5:05/5:30</td>
<td>Review and make correction of draft</td>
</tr>
<tr>
<td>9:14/10:00</td>
<td>Introduction to the software program</td>
</tr>
<tr>
<td>10:00/10:34</td>
<td>Select problem areas</td>
</tr>
<tr>
<td>10:34/11:02</td>
<td>Select tasks</td>
</tr>
<tr>
<td>11:02/12:04</td>
<td>Print sequenced course outline - VoAg I</td>
</tr>
</tbody>
</table>

-------------------------------------------------------------
-------------------------------------------------------------
-------------------------------------------------------------
-------------------------------------------------------------
-------------------------------------------------------------
-------------------------------------------------------------
-------------------------------------------------------------
-------------------------------------------------------------
-------------------------------------------------------------
-------------------------------------------------------------

APPENDIX O

"BACKGROUND INFORMATION" INSTRUMENT
BACKGROUND INFORMATION

CIRCLE YOUR ANSWER

1. Year in school: freshman sophomore junior senior

2. Sex: female male

3. Have you completed student teaching?
   a. No
   b. Yes

4. Taxonomy area that you will be teaching:
   a. Production agriculture
   b. Agricultural business
   c. Horticulture
   d. Agricultural mechanics
   e. Animal care
   f. Environmental science
   g. Forestry
   h. Agricultural resource conservation

5. Highest level of education you have completed:
   a. High school
   b. Trade school
   c. Two year technical school
   d. Some college
   e. College graduate
   f. Some graduate work
   g. Graduate degree

6. Age: ___.

7. Previous typing experience:
   a. Poor (no typing experience)
   b. Fair (limited typing experience)
   c. Good (type your own term papers)
   d. Very good (type term papers for others)

8. Social Security Number:_____—____—_____.

APPENDIX P

"COMPUTER BACKGROUND" INSTRUMENT
COMPUTER BACKGROUND

CIRCLE YOUR RESPONSE(S)

1. How would you rate your ability to use a microcomputer?
   a. Advanced (can program in at least one language and can use canned programs).
   b. Intermediate (feel confident in using canned programs).
   c. Beginner (limited experience, can use canned programs).
   d. Non-user (never have used a microcomputer).

2. I believe a microcomputer should be used: (circle all that apply)
   a. For computer programming (BASIC, PASCAL, Logo, Pilot, etc.).
   b. To aid in facilitating instruction (i.e., data base management, record keeping, spreadsheets etc.).
   c. To teach computer literacy (terms, operation, impact on society).
   d. For computer assisted learning (Computer Assisted Instruction, Computer Managed Instruction, tutorials, simulations, etc.).
   e. For instructional demonstrations (problem solving, demonstrations, etc.)
   f. Other (please specify) ____________________________.

3. Do currently use a microcomputer?
   a. No
   b. Yes Please estimate hours per week: ____ hrs/week

4. Have you had a course on microcomputers?
   a. No
   b. Yes

5. Which of the following statements describe your microcomputer training (circle all that apply)?
   a. Microcomputer dealer seminar/workshop.
   b. High school course(s).
   c. Inservice workshop.
   d. Non-credit college course(s).
   e. Credit college course(s).
   f. Self instruction
   g. Other (please specify) ____________________________.
6. Indicate the total amount of training you have had on the use of microcomputers:
   a. 1/2 to 1 day.
   b. 1 to 2 days.
   c. 2 to 4 days.
   d. 1 week.
   e. 2 to 3 weeks.
   f. Summer session (3 to 5 weeks).
   g. Full quarter course (please specify if more than one full quarter course).
   h. High school course (please specify if more than one course).
   i. Other (specify).

7. Have you had any experience in writing programs for microcomputers?
   a. No
   b. Yes....(check all that apply).....BASIC
      COBOL
      FORTRAN
      PASCAL
      C
      Logo
      Pilot

8. Do you currently have a microcomputer available for your use?
   a. No
   b. Yes

9. Do you have a microcomputer at your place of residence?
   a. No
   b. Yes

10. Do you own a microcomputer?
    a. No
    b. Yes..Brand of microcomputer owned: (check all that apply)
        Apple
        Radio Shack
        IBM or compatible
        Other (please specify)

11. Are you currently a member of a microcomputer user's group?
    a. No
    b. Yes

12. Do you plan to buy a computer within the next year?
    a. No
    b. Yes
13. Are you currently subscribing to a computer magazine(s)?
   a. No
   b. Yes........how many? ___

14. Have you taught and/or assisted other students with microcomputers?
   a. No
   b. Yes

15. Have you taken any high school and/or college classes that used CBI, CBL, and/or CBT (computer-based instruction, learning, and training)?
   a. No
   b. Yes

16. Have you had any high school and/or college classes that used CAI (computer-assisted instruction)?
   a. No
   b. Yes..(check all that apply).... Drill and practice
      __ Tutorials
      __ Simulations
      __ Games
APPENDIX Q
EXAMPLES OF VOCATIONAL AGRICULTURE COURSE
OUTLINES PREPARED BY SUBJECTS

241
SEQUENCED COURSE OUTLINE FOR A 4 YEAR PRODUCTION AGRICULTURE PROGRAM
COURSE OUTLINE
FOR
VOAG-1
1. DEVELOPING AWARENESS OF POLICIES
2. SECURING CHAPTER MEMBERSHIP
3. DEVELOPING COMMUNICATION
4. DEVELOPING LEADERSHIP
5. DEVELOPING THE INDIVIDUAL
6. DEVELOPING SHOP SAFETY
7. USING HAND TOOLS AND POWER TOOLS
8. SELECTING AND PURCHASING LIVESTOCK
9. FEEDING LIVESTOCK
10. HOUSING LIVESTOCK
11. MAINTAINING ANIMAL HEALTH
12. SHOWING LIVESTOCK
13. DEVELOPING MONEY MANAGEMENT
14. INSTALLING AND SERVICING ELECTRICAL SYSTEMS
15. OPERATING FARM MACHINERY
INTRODUCTION TO SCHOOL & PROGRAM POLICIES

DEVELOPING AWARENESS OF POLICIES
- Describe overall school policies
- Describe classroom policies
- Describe laboratory policies
- Describe policies in nonschool settings

PERSONAL DEVELOPMENT

SECURING CHAPTER MEMBERSHIP
- List reasons for membership
- Describe when and where FFA was organized
- Describe how the local FFA is organized
- Describe the benefits of being a member of chapter
- Take part in chapter meetings
- Describe areas of responsibility in the FFA
- Describe characteristics of a good chapter meeting
- Describe responsibilities of officers and members

DEVELOPING COMMUNICATION
- Organize and present a speech
- Introduce a speaker
- Participate in conversations and discussions
- Demonstrate correct use of the telephone
- Write a letter

DEVELOPING LEADERSHIP
- Describe the characteristics of an effective FFA officer
- Demonstrate correct parliamentary procedure
- Serve as a working member of a committee

DEVELOPING THE INDIVIDUAL
- Identify strong/weak points - personality characteristics
- Establish personal goals
- Demonstrate the traits of personal integrity
- Develop initiative
- Develop positive attitudes
- Make introductions and start conversations appropriately
- Manage use of time
- Demonstrate appropriate grooming

AGRICULTURAL MECHANICS

DEVELOPING SHOP SAFETY
- Students will pass skills test before operating new equipment
- Students will exhibit shop safety at all times

Using hand tools and power tools
USE AND MAINTAIN HAND TOOLS
USE AND MAINTAIN POWER TOOLS
PRODUCE SAMPLE WORK USING HAND AND POWER TOOLS

LIVESTOCK PRODUCTION

SELECTING AND PURCHASING LIVESTOCK

SELECT A SPECIES
SELECT LIVESTOCK COMPATIBLE TO THE FARMING PROGRAM
IDENTIFY BREEDS COMMON IN THIS AREA

FEEDING LIVESTOCK

DESCRIBE THE PARTS & ROLE OF THE LIVESTOCK DIGESTIVE SYSTEM
IDENTIFY NUTRITIVE REQUIREMENTS
SELECT FEEDS
DEVELOP RATIONS
FEED FOR SPECIFIC FUNCTIONS
MAINTAIN AND HANDLE QUALITY FEEDS
EVALUATE FEEDING IN RECORDS

HOUSING LIVESTOCK

DETERMINE ANIMAL HOUSING REQUIREMENTS
DISPOSE OR MANAGE ANIMAL WASTES IN APPROVED PROCEDURE
TRANSPORT LIVESTOCK

MAINTAINING ANIMAL HEALTH

USE PREVENTIVE PRACTICES TO MAINTAIN ANIMAL’S GOOD HEALTH
TREAT OR CARE FOR ANIMALS WITH HEALTH AND DISEASE PROBLEMS
DELIVER AND CARE FOR YOUNG ANIMAL

SHOWING LIVESTOCK

TRAIN ANIMALS FOR SHOW
FIT AND GROOM ANIMALS FOR SHOW

PERSONAL DEVELOPMENT

DEVELOPING MONEY MANAGEMENT

DEVELOP A PLAN FOR YOUR FINANCES
SET FINANCIAL GOALS
COMPLETE A NET WORTH STATEMENT
COMPLETE A PERSONAL BUDGET
FIGURE INTEREST ON A SAVINGS ACCOUNT
WRITE CHECKS
RECONCILE A CHECKBOOK
ESTABLISH AND KEEP A GOOD CREDIT RATING

AGRICULTURAL MECHANICS

INSTALLING AND SERVICING ELECTRICAL SYSTEMS
IDENTIFY FUNDAMENTALS OF ELECTRICITY
PLAN AND DESIGN ELECTRICAL SYSTEMS
SELECT AND INSTALL WIRING MATERIALS
INSTALL AND MAINTAIN ELECTRIC MOTORS
PREPARE CIRCUIT BOARD
MAKE AN EXTENSION CORD

OPERATING FARM MACHINERY

OPERATE COMBINES
OPERATE FARM TRACTORS
COURSE OUTLINE
FOR
VOAG-2
1. DEVELOPING AWARENESS OF POLICIES
2. DEVELOPING LEADERSHIP
3. DEVELOPING CITIZENSHIP
4. WORKING WITH COMMITTEES
5. CONSERVING SOIL
6. DEVELOPING SHOP SAFETY
7. USING SMALL ENGINES
8. WORKING WITH COLD METAL
9. WORKING WITH HOT METAL
10. WELDING METAL AND METAL ALLOYS
11. OPERATING FARM MACHINERY
12. PREPARING THE SEEDBED
13. PLANTING THE CROP
14. CONTROLLING PESTS
INTRODUCTION TO SCHOOL & PROGRAM POLICIES

DEVELOPING AWARENESS OF POLICIES

DESCRIBE OVERALL SCHOOL POLICIES
DESCRIBE CLASSROOM POLICIES
DESCRIBE LABORATORY POLICIES
DESCRIBE POLICIES IN NONSCHOOL SETTINGS

PERSONAL DEVELOPMENT

DEVELOPING LEADERSHIP

DESCRIBE THE CHARACTERISTICS OF AN EFFECTIVE FFA OFFICER
DEMONSTRATE CORRECT PARLIAMENTARY PROCEDURE
PARTICIPATE IN DEVELOPMENT OF CHAPTER GOALS
PARTICIPATE IN THE DEVELOPMENT - FFA PROGRAM OF ACTIVITIES
PARTICIPATE IN SETTING CHAPTER PRIORITIES

DEVELOPING CITIZENSHIP

IDENTIFY THE RESPONSIBILITIES OF CITIZENSHIP
DEMONSTRATE RESPECT FOR NATIONAL SYMBOLS AND CUSTOMS
DEMONSTRATE RESPECT FOR THE RIGHTS OF OTHERS
ASSUME RESPONSIBILITY
FORMULATE AND EXPRESS OPINIONS
PARTICIPATE IN COMMUNITY IMPROVEMENT ACTIVITIES

WORKING WITH COMMITTEES

SERVE AS A COMMITTEE MEMBER
SERVE AS A COMMITTEE CHAIRPERSON
ORGANIZE A COMMITTEE MEETING
SELECT MEMBERS FOR A COMMITTEE
EVALUATE THE ACCOMPLISHMENTS OF A COMMITTEE
GIVE A COMPLETE COMMITTEE REPORT

CROP PRODUCTION

CONSERVING SOIL

IDENTIFY THE PHYSICAL AND CHEMICAL FEATURES OF A SOIL
CLASSIFY THE SOIL AND DETERMINE LAND USE
SELECT MANAGEMENT PRACTICES
DETERMINE CROPPING SYSTEM
DETERMINE PLANT NUTRIENT REQUIREMENTS
DETERMINE KINDS AND APPLICATION RATES OF FERTILIZER

AGRICULTURAL MECHANICS

DEVELOPING SHOP SAFETY

STUDENTS WILL PASS SKILLS TEST BEFORE OPERATE NEW EQUIPMENT
STUDENTS WILL EXHIBIT SHOP SAFETY AT ALL TIMES

USING SMALL ENGINES
OPERATE SMALL ENGINES
MAINTAIN SMALL ENGINES
TROUBLE-SHOOT SMALL ENGINES
OVERHALL SMALL ENGINES

WORKING WITH COLD METAL
IDENTIFY METALS
CUT THREADS
FABRICATE COLD METAL

WORKING WITH HOT METAL
IDENTIFY METALS
SOLDER
FORGE
FABRICATE

WELDING METAL AND METAL ALLOYS
USE THE ELECTRIC ARC WELDER (AC-DC)
USE THE OXY-ACETYLENE WELDER
USE THE ARC AND INERT GAS WELDER (MIG-TIG)

OPERATING FARM MACHINERY
OPERATE PLANTERS AND DRILLS
OPERATE PLOWS/HARROWS/DISCS & OTHER SOIL PREPARATION EQ.
OPERATE MOWERS
OPERATE SPRAY SYSTEMS

CROP PRODUCTION

PREPARING THE SEEDBED
IDENTIFY DESIRABLE CHARACTERISTICS OF A GOOD SEEDBED
SELECT TILLAGE SYSTEMS
PREPARE THE SEEDBED

PLANTING THE CROP
SELECT CROP/SEED AND VARIETY
MAINTAIN Viable SEEDS
CALIBRATE AND OPERATE THE PLANTER
SELECT TIME/DEPTH/RATE OF PLANTING & FERTILIZER PLACEMENT
CONTROL SOIL CONDITIONS FOR GERMINATED PLANTS

CONTROLLING PESTS
CONTROL INSECT PESTS
CONTROL WEEDS
CONTROL DISEASES
CONTROL WILDLIFE PESTS
COURSE OUTLINE
FOR
VOAG-3
1. DEVELOPING AWARENESS OF POLICIES
2. CONSERVING SOIL
3. DEVELOPING LEADERSHIP
4. BECOMING ESTABLISHED IN AGRICULTURAL CAREERS
5. DEVELOPING COOPERATION
6. DEVELOPING SHOP SAFETY
7. OPERATING FARM MACHINERY
8. HARVESTING STORE AND MARKET CROPS
9. MAINTAINING AND REPAIRING FARM MACHINERY
10. PLANNING / CONSTRUCTING FARM TOOLS / EQUIPMENT
11. INSTALLING FARM STRUCTURES
12. FENCING THE FARMSTEAD
13. MANAGING THE FOREST
14. MANAGING PONDS
INTRODUCTION TO SCHOOL & PROGRAM POLICIES

DEVELOPING AWARENESS OF POLICIES

- Describe overall school policies
- Describe classroom policies
- Describe laboratory policies
- Describe policies in nonschool settings
- Describe school policy - job placement experience

CROP PRODUCTION

CONSERVING SOIL

- Identify the physical and chemical features of a soil
- Classify the soil and determine land use
- Select management practices

PERSONAL DEVELOPMENT

DEVELOPING LEADERSHIP

- Demonstrate correct parliamentary procedure
- Participate in development of chapter goals
- Participate in the development - FFA program of activities
- Participate in setting chapter priorities
- Serve as a chapter officer
- Serve on the executive committee

BECOMING ESTABLISHED IN AGRICULTURAL CAREERS

- Analyze agricultural career opportunities
- Determine preparation requirements - specific agr. career
- Develop career goals and objectives
- Develop a plan for reaching chosen career
- Locate job opportunities
- Select possible job prospects
- Organize and initiate contact for possible employment
- Organize/develop & produce a well-structured resume
- Complete a sampling of application forms
- Interview for possible employment
- Follow up on interview

DEVELOPING COOPERATION

- Describe basic needs of individuals - affect cooperation
- Demonstrate sensitivity to the needs of others
- Describe characteristics that aid cooperation
- Describe how various leadership styles affect cooperation
- Demonstrate working cooperatively with others
- Describe benefits that may occur from working with others

AGRICULTURAL MECHANICS

DEVELOPING SHOP SAFETY
STUDENTS WILL PASS SKILLS TEST BEFORE OPER. NEW EQUIPMENT
STUDENTS WILL EXHIBIT SHOP SAFETY AT ALL TIMES

OPERATING FARM MACHINERY

OPERATE COMBINES
PREPARE MACHINERY FOR STORAGE

CROP PRODUCTION

HARVESTING STORE AND MARKET CROPS

IDENTIFY WHEN TO HARVEST
SELECT METHOD OF HARVEST
OPERATE HARVESTING EQUIPMENT
SELECT APPROPRIATE MARKETING SYSTEM
STORE AND TRANSPORT THE CROP
SELECT FACILITIES FOR STORAGE
DRY AND AERATE THE CROP

AGRICULTURAL MECHANICS

MAINTAINING AND REPAIRING FARM MACHINERY

MAINTAIN / CALIBRATE / REPAIR PLANTERS AND DRILLS
MAINTAIN/REPAIR FLOWS/BARROWS/DISCS & SOIL PREPARATION EQ.
MAINTAIN/REPAIR MOWERS/RAKES/BALERS & FORAGE HARVESTING EQ.
MAINTAIN AND REPAIR COMBINES
MAINTAIN / CALIBRATE AND REPAIR SPRAY SYSTEMS

PLANNING / CONSTRUCTING FARM TOOLS / EQUIPMENT

PREPARE OR SECURE A BLUEPRINT OF CONSTRUCTION PROJECTS
PREPARE A BILL OF MATERIALS AND SECURE MATERIALS
CONSTRUCT FARM TOOLS OR EQUIPMENT

INSTALLING FARM STRUCTURES

DESIGN AND DO A LAYOUT OF FARM STRUCTURES
CONSTRUCT A BUILDING
MAINTAIN FARM STRUCTURES

FENCING THE FARMSTEAD

SELECT FENCE
CONSTRUCT FENCE

CROP PRODUCTION

MANAGING THE FOREST

ESTABLISH A MANAGEMENT PLAN
CONTROL FOREST PESTS

MANAGING PONDS
IDENTIFY POND REQUIREMENTS
MEASURE POND SIZE
STOCK POND
MAINTAIN FISHING POPULATIONS
CONTROL PESTS (WEED & ANIMAL)
DEVELOP POND RECREATION
COURSE OUTLINE
FOR
VOAG-4
1. DEVELOPING AWARENESS OF POLICIES
2. CONSERVING SOIL
3. DEVELOPING LEADERSHIP
4. DETERMINING OPPORTUNITIES IN FARM BUSINESS MANAGEMENT
5. SELECTING AND USING PROFIT MAXIMIZING PRINCIPLES
6. DEVELOPING MONEY MANAGEMENT
7. DEVELOPING AND USING FARM RECORDS
8. ESTABLISHING CREDIT AND FARM BUSINESS FINANCING
9. GETTING ESTABLISHED IN A FARM BUSINESS
10. DETERMINING AN INVENTORY OF FARM BUSINESS RESOURCES
11. DETERMINING INSURANCE NEEDS
12. MANAGING FARM TAXES
13. ANALYZING FARM LAW
14. MARKETING FARM PRODUCTS
INTRODUCTION TO SCHOOL & PROGRAM POLICIES

DEVELOPING AWARENESS OF POLICIES

DESCRIBE OVERALL SCHOOL POLICIES
DESCRIBE CLASSROOM POLICIES
DESCRIBE LABORATORY POLICIES
DESCRIBE POLICIES IN NONSCHOOL SETTINGS
DESCRIBE SCHOOL POLICY - JOB PLACEMENT EXPERIENCE

CROP PRODUCTION

CONSERVING SOIL

IDENTIFY THE PHYSICAL AND CHEMICAL FEATURES OF A SOIL
CLASSIFY THE SOIL AND DETERMINE LAND USE
SELECT MANAGEMENT PRACTICES

PERSONAL DEVELOPMENT

DEVELOPING LEADERSHIP

DEMONSTRATE CORRECT PARLIAMENTARY PROCEDURE
PARTICIPATE IN DEVELOPMENT OF CHAPTER GOALS
PARTICIPATE IN THE DEVELOPMENT - FFA PROGRAM OF ACTIVITIES
PARTICIPATE IN SETTING CHAPTER PRIORITIES
SERVE AS A CHAPTER OFFICER
SERVE ON THE EXECUTIVE COMMITTEE

FARM MANAGEMENT

DETERMINING OPPORTUNITIES IN FARM BUSINESS MANAGEMENT

DESCRIBE TOTAL CONCEPT OF FARM BUSINESS MANAGEMENT
DETERMINE TEN BUSINESSES REQUIRING MANAGEMENT SKILLS
DETERMINE TEN EMPLOYMENT OPPORTUNITIES SIMILAR TO FARM BUSINESS

SELECTING AND USING PROFIT MAXIMIZING PRINCIPLES

MAKE APPLICATION OF THE PRINCIPLE OF "DIMINISHING RETURNS"
MAKE APPLICATION OF PRINCIPLE "COMBINATION OF ENTERPRISE"
MAKE APPLICATION OF THE PRINCIPLE OF "SUBSTITUTION"
MAKE APPLICATION OF THE PRINCIPLE OF "OPPORTUNITY COST"
MAKE APPLICATION OF PRINCIPLE OF "FIXED/VARIABLE COSTS"

PERSONAL DEVELOPMENT

DEVELOPING MONEY MANAGEMENT

DEVELOP A PLAN FOR YOUR FINANCES
SET FINANCIAL GOALS
CALCULATE THE VALUE OF REAL ESTATE IN THE COMMUNITY
COMPLETE A NET WORTH STATEMENT
COMPLETE A PERSONAL BUDGET
WRITE CHECKS
RECONCILE A CHECKBOOK
DETERMINE THE DOWN PAYMENT NEEDED FOR A MAJOR PURCHASE
DETERMINE THE ABILITY TO REPAY A LOAN
ESTABLISH AND KEEP A GOOD CREDIT RATING
MAKE APPLICATION FOR A LOAN

FARM MANAGEMENT

DEVELOPING AND USING FARM RECORDS

SELECT A FARM BUSINESS RECORD SYSTEM
DEVELOP RECORD KEEPING TECHNIQUES AND PROCEDURES
DEVELOP ENTERPRISE PRODUCTION RECORD SYSTEM
SUMMARIZE AND ANALYZE FARM RECORDS
EVALUATE FARM MANAGEMENT PRACTICES BASED ON INFORMATION

ESTABLISHING CREDIT AND FARM BUSINESS FINANCING

ESTABLISHING SOURCES OF FARM BUSINESS CREDIT
PREPARE AND ANALYZE A NET WORTH STATEMENT
PREPARE AND ANALYZE AN ANNUAL OPERATING BUDGET
PREPARE AND ANALYZE A CASH FLOW CHARGE
DEVELOP A DEBT PAYMENT SCHEDULE FOR THE FARM BUSINESS
PRESENT A CREDIT/FINANCING PLAN TO A PROSPECTIVE LENDER
DEVELOP ENTERPRISE BUDGETS AS A BASIS FOR DECISION MAKING

GETTING ESTABLISHED IN A FARM BUSINESS

DEVELOP GOALS FOR ACQUISITION OF A FARM BUSINESS
DEVELOP LEASE OR PARTNERSHIP AGREEMENT
DEVELOP A CROP AND LIVESTOCK PRODUCTION PROGRAM
DETERMINE POWER AND MACHINERY REQUIREMENTS
DETERMINE LABOR REQUIREMENTS
SELECT A FARM BUSINESS RECORD SYSTEM
DEVELOP FARM ENTERPRISE BUDGET FOR EACH CROP/LIVESTOCK UNIT
DEVELOP A FINANCIAL PLAN (CREDIT/RECEIPTS/COSTS/CASH FLOW/ETC.)
DEVELOP GOALS FOR PARTICIPATION IN COMMUNITY & AGR. ACTIVITIES

DETERMINING AN INVENTORY OF FARM BUSINESS RESOURCES

INVENTORY BUILDINGS AND STRUCTURES
INVENTORY SOIL RESOURCES
INVENTORY FARM POWER MACHINERY AND EQUIPMENT
INVENTORY LIVESTOCK
INVENTORY GRAIN AND FORAGE
INVENTORY THE RESOURCES OF A "CASE FARM" OR STUDENT'S FARM

DETERMINING INSURANCE NEEDS

SELECT LIABILITY INSURANCE COVERAGE
DETERMINE APPROPRIATE AMOUNTS AND KINDS OF LIFE INSURANCE
SELECT FIRE AND WINDSTORM INSURANCE FOR THE FARM BUSINESS
SELECT CROP INSURANCE COVERAGE
SELECT COVERAGE FOR FARM VEHICLES AND EQUIPMENT

MANAGING FARM TAXES
COMPLETE TAX FORMS FOR A FARM BUSINESS
DETERMINE FEDERAL OBLIGATIONS ON THE PROPER REPORT FORMS
DETERMINE STATE OBLIGATIONS ON THE PROPER REPORT FORMS
DETERMINE LOCAL TAX OBLIGATIONS ON THE PROPER REPORT FORMS
DETERMINE FARM BUSINESS REAL ESTATE TAX

ANALYZING FARM LAW

IDENTIFY THE MAJOR LEGAL PRECAUTIONS RELATING TO PROPERTY
IDENTIFY THE MAJOR LEGAL PRECAUTIONS AS REGARDS TENANCY
DETERMINE LEGAL CONSIDERATIONS RELATING TO FARM LABOR
DETERMINE DRAINAGE AND WATER RIGHTS OF FARMERS
DETERMINE MAJOR LEGAL PRECAUTIONS RELATING TO LIVESTOCK
DETERMINE MAJOR LEGAL PRECAUTIONS & CUSTOM WORK DONE

MARKETING FARM PRODUCTS

ANALYZE METHODS OF MARKETING FARM PRODUCTS
DETERMINE ALTERNATIVE GRAIN MARKETING PLANS
DETERMINE LIVESTOCK MARKETING PLANS
DETERMINE OTHER FARM MARKET PRODUCTS MARKETING PLANS
SMALL ANIMAL CARE

Senior Class
I. Introduction to School and Program
   A. Developing Awareness of School and Program Policies.
      1. Describe overall school policies.
      2. Describe classroom policies.
      3. Describe laboratory policies.
      4. Describe policies in a nonschool setting.
      5. Describe school policies in regards to job placement experience.
      6. Describe classroom safety policies.

II. Personal Development / Leadership
   A. Securing Chapter Membership in the FFA.
      1. List reasons for membership.
      2. Describe when and where FFA was organized.
      3. Describe how the FFA (locally) was organized.
      4. Describe the benefits of being a member.
      5. Take part in a chapter meeting.
      6. Describe responsibilities of officers and members.

E. Becoming Established in Small Animal Care Careers.
   1. Analyze career opportunities.
   2. Develop career goals.
   3. Select possible job prospects.
   4. Complete sampling application forms.
   5. Develop a sample interview type situation.

III. Business Management
   A. Performing General Office Work.
      1. Greet clients.
      2. Admit and dismiss patients.
      4. Utilize the telephone.
      5. Wear appropriate dress.
6. Write memos, notes, and letters.
7. File office forms and letters.
8. Balance daily cash statements.
9. Handle payment for account.
10. Deposit daily receipts.
11. Write checks.
12. Maintain credit accounts, accounts receivable, and accounts payable records.
13. Develop a recordbook system.

B. Operating and Maintaining the Retail Wholesale Establishment
1. Demonstrate operating a retail establishment.
2. Establish an effective sales area.
3. Decorate a shop window.
4. Prepare a newspaper advertisement.
5. Develop a promotional program.
6. Determine cost of facilities and equipment needed to establish a business.

IV. Grooming Animals
A. General Grooming Procedures.
1. Identify grooming equipment.
2. Select equipment to be utilized.
3. Bathe animals.
4. Clean animal ears.
5. Clip nails.
6. Comb out animals.
7. Perform selected clipping patterns.
8. Wash/dry animals.
9. Identify soap and water differences.
10. Pluck hair.
11. Perform various scissoring patterns.
12. Identify clipping problems.
13. Identify post clipping problems.

   1. Design 3 types of bows.
   2. Demonstrate the lamb clip.
   3. Demonstrate the dutch clip.
   4. Demonstrate the town and country clip.
   5. Demonstrate the summer clip.
   6. Demonstrate other selective clips.
   7. Evaluate various prices for grooming services.
   8. Determine the cost of facilities and equipment needed to establish a grooming business.

V. Petshop Management

A. Inventory Products.
   1. Identify the correct procedure for taking inventory.
   2. Determine inventory of supplies and equipment.
   3. Determine when supplies need to be ordered.
   4. Remove expired products from the inventory.
   5. Remove contaminated items from the stock.
   6. Obtain supplies to maintain inventory.

B. Selling and Marketing Products.
   1. Demonstrate meeting the customer.
   2. Determine whether product requested is available.
   3. Demonstrate items for sale.
   4. Determine the price of the products for the customer.
   5. Complete a sales slip.
   6. Operate a cash register.
   7. Handle change, bills, and checks.
8. Handle the product after the sale.
9. Determine how to handle the customer complaints.
10. Explain the rules and policies of the business.
11. Prepare package label and display merchandise.
12. Utilize stock pricing equipment.

C. Selecting and Handling Small Animals.
1. Determine breed standards of small dogs.
2. Identify major breeds of dogs.
3. Describe major categories of dogs.
5. Identify major breeds of cats.
6. Identify the various strains of rodents.
7. Demonstrate handling various strains of rodents.
8. Identify the various strains of guinea pigs.
9. Demonstrate the handling of guinea pigs.
10. Identify the major breeds of rabbits.
11. Demonstrate the handling rabbits.
12. Determine the normal animal behavioral patterns.
13. Determine disease symptoms of small animals.
14. Demonstrate housing small animals.
15. Demonstrate feeding small animals.

D. Managing Fish.
1. Identify fish varieties.
2. Identify their breeding habits.
3. Select proper lighting, backgrounds, gravel, and plants for tanks.
4. Identify anatomy and sex of the fish.
5. Determine water quality.
6. Determine the best type of food for each fish.
7. Demonstrate care of the young.
E. Managing Birds.
   1. Distinguish various types of species of birds.
   2. Demonstrate nail, beak, and wing trimming.
   3. Demonstrate disinfecting cages and equipment.
   4. Recognize common diseases.
   5. Determine caging and housing.
   6. Determine requirements for feeding and housing.
   7. Demonstrate handling various types of birds.
   8. Demonstrate breeding and raising birds.

F. Managing Amphibians and Reptiles.
   1. Identify common amphibians.
   2. Identify common reptiles.

VI. Animal Health

A. Recording Information.
   1. Record general client information.
   2. Record general patient information.
   3. Record feeding information.
   4. Record medication information.
   5. Record vaccination information.
   6. Record weight information.
   7. Record mortality and birth rate.

B. Handling and Caring for Animals.
   1. Place animals in cages or holding pens.
   2. Provide proper environment for animals.
   3. Observe animals for problems.
   4. Demonstrate identification markings.
   5. Weigh in an animal.
   6. Demonstrate restraining mechanisms.

C. Feeding Animals.
1. Identifying the basic components of feed.
2. Prepare feed.
3. Determine the amount of feed required by the animal.
4. Determine the animals requirements.
5. Determine the cost of the various rations.
6. Identify the common storage procedures.
7. Identify the moldy or spoiled food.
8. Identify symptoms of nutrient imbalance.

D. Breeding Animals.
1. Identify the reproductive systems.
2. Demonstrate management and care.
3. Determine when to breed the females.
4. Determine when the female is due.
5. Determine when the female should be rebred.
6. Determine when male/female can be bred.
7. Determine when one can cross breed and when one can inbreed.

E. Identifying Anatomy and Physiology.
1. Identify the circulatory system.
2. Identify the skeletal system.
3. Identify the digestive system.
4. Identify the reproductive system.
5. Identify the urinary system.

VII. Dog Obedience
A. Training Animals.
1. Identify the different behaviors of various animals.
2. Establish the procedures for training the animals.
3. Identify the training equipment.
4. Demonstrate the use of the equipment.
5. Determine when the animals are ready to be trained.
6. Train animals to stand.
7. Train animals to lead.
8. Train animals to follow commands.
9. Exhibit trained animal.
APPENDIX R

"VOCATIONAL AGRICULTURE COURSE OUTLINE SCORE SHEET"
Below are several statements about content and format of the sequenced course outlines developed by students. Please read each statement and then score each statement between 0 and 100 (except number 11).

Example: The course objectives were stated.................. 78

<table>
<thead>
<tr>
<th>Content</th>
<th>Score (0 to 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1—There are an adequate number of problem areas for each grade level..............................</td>
<td></td>
</tr>
<tr>
<td>2—Problem areas are logically sequenced within the school year...................................</td>
<td></td>
</tr>
<tr>
<td>3—Problem areas are repeated when appropriate within a grade level and/or between grade levels....................................</td>
<td></td>
</tr>
<tr>
<td>4—Problem areas for each year are appropriate for the intended grade level.......................</td>
<td></td>
</tr>
<tr>
<td>5—The overall selection of problem areas for the document is excellent..............................</td>
<td></td>
</tr>
<tr>
<td>Total Score_______</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Format</th>
<th>Score (0 to 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6—The document is legible (readable).............</td>
<td></td>
</tr>
<tr>
<td>7—The document has adequate margins.............</td>
<td></td>
</tr>
<tr>
<td>8—The document could be given to parents, administration, and students based on the overall format/appearance of the document.............................</td>
<td></td>
</tr>
<tr>
<td>9—The cover page and title (one for each year taught) pages are adequate...........................</td>
<td></td>
</tr>
<tr>
<td>10—Punctuation, grammar, and spelling are correct throughout the document...........................</td>
<td></td>
</tr>
<tr>
<td>11—Would you consider any format problems encountered caused predominantly by: (Circle your answer) a. computer error. b. user error.</td>
<td></td>
</tr>
<tr>
<td>Total Score_______</td>
<td></td>
</tr>
</tbody>
</table>

Social Security Number:____________________
APPENDIX S
WEIGHTS USED BY THE RESEARCHER FOR THE
CRITERIA STATEMENTS ON THE "VOCATIONAL AGRICULTURE
COURSE OUTLINE SCORE SHEET"
TABLE 65
Weights Used by the Researcher for the Criteria Statements on the "Vocational Agriculture Course Outline Score Sheet"

<table>
<thead>
<tr>
<th>Criteria Statements</th>
<th>Weights (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1—There are an adequate number of problem areas for each grade level</td>
<td>6</td>
</tr>
<tr>
<td>2—Problem areas are logically sequenced within the school year</td>
<td>30.5</td>
</tr>
<tr>
<td>3—Problem areas are repeated when appropriate within a grade level and/or between grade levels</td>
<td>17</td>
</tr>
<tr>
<td>4—Problem areas for each year are appropriate for the intended grade level</td>
<td>19.5</td>
</tr>
<tr>
<td>5—The overall selection of problem areas for the document is excellent</td>
<td>27</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
<tr>
<td>6—The document is legible (readable)</td>
<td>15</td>
</tr>
<tr>
<td>7—The document has adequate margins</td>
<td>6</td>
</tr>
<tr>
<td>8—The document could be given to parents, administration, and students based on the overall format/appearance of the document</td>
<td>36.5</td>
</tr>
<tr>
<td>9—The cover page and title (one for each year taught) pages are adequate</td>
<td>6</td>
</tr>
<tr>
<td>10—Punctuation, grammar, and spelling are correct throughout the document</td>
<td>36.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
APPENDIX T

EXPERIMENTAL GROUP AND PANEL OF COMPUTER EXPERTS

MEAN SCORES AND STANDARD DEVIATIONS FOR THE "SOFTWARE EVALUATION" INSTRUMENT
<table>
<thead>
<tr>
<th>Question</th>
<th>Experimental Group (n=8)</th>
<th>Faculty Panel (n=3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
</tr>
<tr>
<td>1. The use of a microcomputer for curriculum planning was a significant advance in technology</td>
<td>4.63</td>
<td>.916</td>
</tr>
<tr>
<td>2. The software program met the requirements of Ag. Ed. 585</td>
<td>5.13</td>
<td>.641</td>
</tr>
<tr>
<td>3. The software program allowed flexibility in developing my sequenced course of study</td>
<td>4.25</td>
<td>.707</td>
</tr>
<tr>
<td>4. The software program was not easy to use</td>
<td>3.50</td>
<td>.756</td>
</tr>
<tr>
<td>5. The software program helped me optimize the use of my time</td>
<td>4.50</td>
<td>.535</td>
</tr>
<tr>
<td>6. The style of presentation of the computer program was not appropriate for the development of a sequenced course outline</td>
<td>4.00</td>
<td>.756</td>
</tr>
<tr>
<td>7. I enjoyed developing my curriculum enough to be willing to use the program again</td>
<td>4.50</td>
<td>.535</td>
</tr>
<tr>
<td>8. Software objectives appeared to be based on the real needs of the user</td>
<td>4.25</td>
<td>.707</td>
</tr>
<tr>
<td>9. Objectives and purposes for the software program were not clearly stated</td>
<td>3.50</td>
<td>.756</td>
</tr>
<tr>
<td>10. The program effectively challenges teacher creativity</td>
<td>3.88</td>
<td>.835</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Rating</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>11</td>
<td>Use of the software program was motivating</td>
<td>4.00</td>
</tr>
<tr>
<td>12</td>
<td>There were errors that made this software frustrating to use</td>
<td>3.13</td>
</tr>
<tr>
<td>13</td>
<td>The program was relatively bug free (no technical problems)</td>
<td>3.57</td>
</tr>
<tr>
<td>14</td>
<td>This program was not suitable for the intended purposes</td>
<td>4.50</td>
</tr>
<tr>
<td>15</td>
<td>The various skill levels of users were adequately addressed and handled</td>
<td>4.00</td>
</tr>
<tr>
<td>16</td>
<td>The user does not have enough control over the rate and sequence of presentation and review</td>
<td>3.75</td>
</tr>
<tr>
<td>17</td>
<td>Avenues for review were provided and placed under the user's control</td>
<td>4.00</td>
</tr>
<tr>
<td>18</td>
<td>Program instructions were not easy to follow</td>
<td>2.50</td>
</tr>
<tr>
<td>19</td>
<td>Use of the program required minimal assistance</td>
<td>3.38</td>
</tr>
<tr>
<td>20</td>
<td>Users can access the program menu(s) to change activities</td>
<td>3.88</td>
</tr>
<tr>
<td>21</td>
<td>Users can enter or exit the program as desired</td>
<td>3.25</td>
</tr>
<tr>
<td>22</td>
<td>Cues and prompts were provided so the user can respond correctly</td>
<td>3.63</td>
</tr>
<tr>
<td>23</td>
<td>The commands were not easily remembered</td>
<td>4.13</td>
</tr>
<tr>
<td>24</td>
<td>Corrections were easy to make</td>
<td>3.50</td>
</tr>
<tr>
<td>25</td>
<td>The program moved from operation to operation efficiently</td>
<td>3.75</td>
</tr>
<tr>
<td>26</td>
<td>The program does not achieve its intended purpose</td>
<td>3.88</td>
</tr>
<tr>
<td>27</td>
<td>The program allowed easy manipulation of the information in the data files</td>
<td>4.00</td>
</tr>
<tr>
<td>Number</td>
<td>Statement</td>
<td>Rating</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>28</td>
<td>The program worked with no observable error conditions</td>
<td>3.63</td>
</tr>
<tr>
<td>29</td>
<td>The program achieved the stated objectives</td>
<td>4.25</td>
</tr>
<tr>
<td>30</td>
<td>The text that appeared on the video screen was easy to read (legible &amp; attractive)</td>
<td>4.38</td>
</tr>
<tr>
<td>31</td>
<td>Screen formatting (layout/organization) was poorly handled</td>
<td>3.63</td>
</tr>
<tr>
<td>32</td>
<td>Transitions between video sequences were not distracting</td>
<td>3.88</td>
</tr>
<tr>
<td>33</td>
<td>The screen format was neat and uncluttered</td>
<td>4.25</td>
</tr>
<tr>
<td>34</td>
<td>The content was not accurate</td>
<td>3.88</td>
</tr>
<tr>
<td>35</td>
<td>The content was current and timely</td>
<td>3.88</td>
</tr>
<tr>
<td>36</td>
<td>The content was not clearly presented</td>
<td>4.25</td>
</tr>
<tr>
<td>37</td>
<td>The software program utilized the unique capabilities of the microcomputer to assist the user in developing a course outline</td>
<td>4.25</td>
</tr>
<tr>
<td>38</td>
<td>The program was free of spelling and grammatical errors</td>
<td>4.25</td>
</tr>
<tr>
<td>39</td>
<td>I would not recommend the software program to other teachers</td>
<td>4.00</td>
</tr>
<tr>
<td>40</td>
<td>This software program was an effective use of microcomputers for teachers</td>
<td>4.38</td>
</tr>
<tr>
<td>41</td>
<td>This software program was not an appropriate use of microcomputers for teachers</td>
<td>3.88</td>
</tr>
</tbody>
</table>

Total 3.96 .357 4.61 .176
Note. Statements 4, 6, 9, 12, 14, 16, 18, 23, 26, 31, 34, 36, 39, and 41 were worded by the researcher to require a negative response (disagree, strongly disagree, very strongly disagree) by the respondents. These responses were reversed for data analysis.
APPENDIX U

EXPERIMENTAL GROUP AND CONTROL GROUP MEAN SCORES
AND STANDARD DEVIATIONS FOR THE "ATTITUDE TOWARD
MICROCOMPUTERS" INSTRUMENT
<table>
<thead>
<tr>
<th>Question</th>
<th>Control Group (n=7)</th>
<th>Experimental Group (n=8)</th>
<th>Total (N=15)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
<td>Mean</td>
</tr>
<tr>
<td>1. Microcomputers do not have a place in my future</td>
<td>4.71 .488</td>
<td>5.13 .641</td>
<td>4.93 .594</td>
</tr>
<tr>
<td>2. Microcomputers can be used to increase student learning</td>
<td>4.00 1.155</td>
<td>4.25 .463</td>
<td>4.13 .834</td>
</tr>
<tr>
<td>3. I feel comfortable talking about microcomputer uses</td>
<td>3.57 1.272</td>
<td>4.00 .926</td>
<td>3.80 1.082</td>
</tr>
<tr>
<td>4. I feel comfortable using microcomputers</td>
<td>5.29 .951</td>
<td>5.38 .518</td>
<td>5.33 .724</td>
</tr>
<tr>
<td>5. I feel uncomfortable &quot;powering-up&quot; a microcomputer</td>
<td>4.14 .690</td>
<td>4.75 .886</td>
<td>4.47 .834</td>
</tr>
<tr>
<td>6. Taking a test on a microcomputer would not lower my performance</td>
<td>3.86 1.574</td>
<td>4.75 .707</td>
<td>4.33 1.234</td>
</tr>
<tr>
<td>7. I feel comfortable using &quot;canned&quot; (ready to run) programs than developing (programming) my own programs</td>
<td>4.86 .690</td>
<td>5.13 .641</td>
<td>5.00 .655</td>
</tr>
<tr>
<td>8. Microcomputers make too many errors for me to trust them</td>
<td>3.86 1.35</td>
<td>5.00 .926</td>
<td>4.47 1.246</td>
</tr>
</tbody>
</table>
9. Microcomputers are primarily for agricultural production and/or agricultural business and have limited use in other areas of vocational agriculture

10. Microcomputers will increase my work load

11. Microcomputers will not become a major part of my job responsibilities in the foreseeable future

12. Microcomputers should be operated primarily by the secretarial staff and not by agricultural teachers

13. Microcomputers are primarily for those teachers who are computer literate

14. Microcomputers can perform many functions for a teacher that are currently being done manually

15. For the most part, microcomputers can be considered a "passing fad"

16. There is limited use for microcomputers in vocational agriculture

17. Vocational agriculture students should be taught how to use the microcomputer as a tool to assist them in decision making
<table>
<thead>
<tr>
<th></th>
<th>Statement</th>
<th>Mean 1</th>
<th>SD 1</th>
<th>Mean 2</th>
<th>SD 2</th>
<th>Mean 3</th>
<th>SD 3</th>
<th>Mean 4</th>
<th>SD 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.</td>
<td>I feel confident teaching students to use a microcomputer</td>
<td>3.71</td>
<td>1.380</td>
<td>3.50</td>
<td>1.195</td>
<td>3.60</td>
<td>1.242</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Teaching the use of microcomputers to students will require much time on my part</td>
<td>2.57</td>
<td>.535</td>
<td>2.63</td>
<td>.744</td>
<td>2.60</td>
<td>.632</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>I feel that computers should not be in the vocational agriculture classrooms</td>
<td>5.00</td>
<td>.816</td>
<td>4.13</td>
<td>2.031</td>
<td>4.53</td>
<td>1.598</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>I feel that vocational agriculture teachers should be competent in using microcomputers</td>
<td>4.00</td>
<td>.816</td>
<td>5.13</td>
<td>.641</td>
<td>4.60</td>
<td>.910</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>All vocational agriculture teachers should subscribe to a computer magazine</td>
<td>2.57</td>
<td>.535</td>
<td>2.75</td>
<td>1.035</td>
<td>2.67</td>
<td>.818</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>All vocational agriculture teachers should be required to receive microcomputer inservice training</td>
<td>3.86</td>
<td>1.345</td>
<td>4.63</td>
<td>.916</td>
<td>4.27</td>
<td>1.163</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>I feel that vocational agriculture teachers should be literate in using microcomputers</td>
<td>4.43</td>
<td>.976</td>
<td>5.00</td>
<td>.535</td>
<td>4.73</td>
<td>.799</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4.25</td>
<td>.407</td>
<td>4.56</td>
<td>.401</td>
<td>4.41</td>
<td>.420</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note.** Statements 4, 5, 8, 9, 10, 11, 12, 13, 15, 16, 19, and 20 were worded by the researcher to require a negative response (disagree, strongly disagree, very strongly disagree) by the respondents. These responses were reversed for data analysis.
APPENDIX V

RANK OF SUBJECTS BY TOTAL AND WEIGHTED TOTAL SCORES
ON COMPLETED SEQUENCED COURSE OUTLINES
TABLE 68

RANK OF SUBJECTS BY TOTAL AND WEIGHTED TOTAL SCORES ON

COMPLETED SEQUENCED CORSE OUTLINES

<table>
<thead>
<tr>
<th>Rank</th>
<th>Subject (N=15)</th>
<th>Score</th>
<th>Subject (N=15)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A&lt;sup&gt;a&lt;/sup&gt;</td>
<td>92.9</td>
<td>A&lt;sup&gt;a&lt;/sup&gt;</td>
<td>92.6</td>
</tr>
<tr>
<td>2</td>
<td>I</td>
<td>85.3</td>
<td>I</td>
<td>86.5</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>84.6</td>
<td>O</td>
<td>85</td>
</tr>
<tr>
<td>4</td>
<td>C&lt;sup&gt;a&lt;/sup&gt;</td>
<td>81.8</td>
<td>F</td>
<td>83.9</td>
</tr>
<tr>
<td>5</td>
<td>O</td>
<td>81.7</td>
<td>J</td>
<td>82.3</td>
</tr>
<tr>
<td>6</td>
<td>J</td>
<td>80.3</td>
<td>N</td>
<td>81.8</td>
</tr>
<tr>
<td>7</td>
<td>D</td>
<td>80.1</td>
<td>D</td>
<td>80.9</td>
</tr>
<tr>
<td>8</td>
<td>B</td>
<td>80.1</td>
<td>C&lt;sup&gt;a&lt;/sup&gt;</td>
<td>80.7</td>
</tr>
<tr>
<td>9</td>
<td>N</td>
<td>80.0</td>
<td>B</td>
<td>80.7</td>
</tr>
<tr>
<td>10</td>
<td>K&lt;sup&gt;a&lt;/sup&gt;</td>
<td>74.2</td>
<td>K&lt;sup&gt;a&lt;/sup&gt;</td>
<td>73</td>
</tr>
<tr>
<td>11</td>
<td>L&lt;sup&gt;a&lt;/sup&gt;</td>
<td>71.7</td>
<td>L&lt;sup&gt;a&lt;/sup&gt;</td>
<td>71.8</td>
</tr>
<tr>
<td>12</td>
<td>E&lt;sup&gt;a&lt;/sup&gt;</td>
<td>65.7</td>
<td>E&lt;sup&gt;a&lt;/sup&gt;</td>
<td>67.6</td>
</tr>
<tr>
<td>13</td>
<td>C&lt;sup&gt;a&lt;/sup&gt;</td>
<td>61.0</td>
<td>M&lt;sup&gt;a&lt;/sup&gt;</td>
<td>67.3</td>
</tr>
<tr>
<td>14</td>
<td>H&lt;sup&gt;a&lt;/sup&gt;</td>
<td>59.8</td>
<td>G&lt;sup&gt;a&lt;/sup&gt;</td>
<td>64.5</td>
</tr>
<tr>
<td>15</td>
<td>H&lt;sup&gt;a&lt;/sup&gt;</td>
<td>57.2</td>
<td>H&lt;sup&gt;a&lt;/sup&gt;</td>
<td>61.7</td>
</tr>
</tbody>
</table>

<sup>a</sup>Experimental group.

*Spearman rank-order correlation coefficient (r<sub>S</sub>) = 0.96.
APPENDIX W

VOCATIONAL PROGRAM SUGGESTED COURSE OF STUDY CHECKLIST

FOR PRIDE REVIEW
VOCATIONAL PROGRAM
SUGGESTED COURSE OF STUDY CHECKLIST
FOR PRAISE REVIEW.

COMPONENT

I. COVER SHEET
II. STATEMENT OF APPROVAL BY BOARD OF EDUCATION
III. DISTRICT PHILOSOPHY AND GOALS
IV. SCOPE AND SEQUENCE
   Program Objectives
   Subject Objectives
V. PUPIL EVALUATION POLICY
VI. COMPLETE SEQUENCED COURSE OUTLINE
    BASED ON TASK ANALYSIS
    (A sequenced list of tasks which are selected to be
    taught in the local program. This list is selected
    by the local supervisor, instructor, and advisory
    committee after analyzing the occupational data.)
VII. INSTRUCTIONAL PROGRAM STRATEGIES
    (Methods of planning, organizing, manipulating, and
    integrating facilities, equipment, instructional
    aids, materials, time, and students within the
    limits of school policy for the purpose of teaching
    tasks and related content)
VIII. GROUPED AND SCHEDULED LABORATORY ACTIVITIES
    (Group - a series of tasks or modules grouped
    together for instructional purposes and placed
    in a general time frame)
    (Schedule - a timed plan for the rotation of
    students through the practice of a series of
    tasks or modules)
    (Module - a subdivision of a group of tasks or
    competencies composed of lessons to be taught
    in close sequence)
IX. ORGANIZED RELATED INSTRUCTIONAL CONTENT
    (Mathematics, Communications, Safety, and
    Science)
    (Content—related technical knowledge—the cognitive
    information and technical understanding
    that a worker needs to perform the manipulative
    tasks of the occupation and to adjust to changes
    required in the performance of those tasks by
    technological developments)

Notes:

*Suggested, but not required
(Components II—V are required by E/S.)
LIST OF REFERENCES


Computing education needs analysis of The Ohio State University Faculty (1985). Instruction and Research Computer Center, The Ohio State University, Columbus, OH, pp. 1-16.

"Course outline" (undated). Dayton Public School System, Dayton, OH, pp. 1-16.

Course of Study Development A Process Model (1980). Ohio Department of Education, Columbus, OH.


Hedges, L. H. (1985, August). Class handouts on course of study development and program planning. The Ohio State University, Columbus, OH.

Hedges, L. H. (1986, February). [Interview with Lowell H. Hedges, Associate Professor, Agricultural Education, The Ohio State University, Columbus, OH].


Henderson, J. L. (1985, September). [Interview with Janet L. Henderson, Assistant Professor, Agricultural Education, The Ohio State University, Columbus, OH].

Henderson, J. L. & Powell, R. L. (1985, December). Instructions given to the experimental group enrolled in Agricultural Education 585, The Ohio State University, Columbus, OH.


Henderson, J. L. (1986, February). [Interview with Janet L. Henderson, Assistant Professor, Agricultural Education, The Ohio State University, Columbus, OH].


McCracken, J. D. (1984, July). [Interview with J. David McCracken, Professor, Agricultural Education, The Ohio State University, Columbus, Ohio about possible topics for my dissertation].

McCracken, J. D. (1986, August). [Interview with J. David McCracken, Professor, Agricultural Education, The Ohio State University, Columbus, Ohio on the amount of time agricultural teachers currently are spending on developing course of studies as compared to ten years ago].


Process Model for Course of Study (1983). Ohio Department of Education, Columbus, OH.


Yoder, E. P. & McCracken, J. D. (1975). Tasks essential to successful performance within each of four occupational areas in agriculture. The Ohio State University Research Foundation, Columbus, OH, pp. 1-67.