A Comparison of the Computer Skills Needed by Business Administration Graduates as Perceived by Personnel Directors in Ohio and Current Skills Being Taught in Ohio Colleges and Universities.

DISSERTATION

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

By

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***

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1992

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Finally, I would like express my gratefulness to my family for their support and encouragement over the years, none of this would have been possible without their support.
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Minor Field: Business Education
Minor Field: Computer Education
Minor Field: Adult Education

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Studies in Computer Education: Professors Anthony A.
                               Olinzock, and Otto Santos, Jr.

Studies in Adult Education: Professors William
                           Dowling, and Kevin Freer.

Studies in Research: Professors Larry Miller, J. David
                    McCracken, and Emmalou Norland.

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CHAPTER I
INTRODUCTION

Introduction

This study focused on examining the relationships of the computer skills needed by business administration graduates and computer skills currently being taught in Ohio university and college business administration departments.

Problem Description

The problem of matching computer skills needed on the job with computer skills being taught at colleges and universities is a topic of conversation each year at the Ohio Management Information Systems (MIS) Faculty conference. The Ohio MIS Faculty Conference is an annual event in which business administration faculty members from across the state of Ohio meet and discuss items of concern. Faculty are very concerned about teaching information that will be valuable to students, and which can be applied after graduation.
One topic that arises every year is "Are we teaching something that our students need?" In the business administration discipline, the area of concern when discussing computer skills is "Are business departments using and teaching the application software business graduates will need?" The answer to this question seems to change every year. Starling (1984, p. 4) stated that "some of the things that tomorrow's managers will need to know are not being taught today." Wheeler (1986) suggested that educational institutions have not grown in computer usage at the same rate as employing businesses.

The people involved in this problem include: businesses; college and university professors teaching in, and directing business administration programs; business administration departments; and business administration students graduating from colleges and universities. This research study should benefit all these individuals. Businesses benefit because qualified college/university graduates are available to fill entry-level positions. Students benefit by being prepared for these positions. College and university business administration departments benefit by providing a program that is attractive to potential students and building the reputation with businesses as
being a source of good business administration graduates. The new information resulting from this study helps the university business administration departments identify the needs of businesses as they relate to computer skills needed by entry-level business administration personnel. This study was designed to investigate the relationship between the computer skills taught at Ohio colleges and universities and the computer skills needed by Ohio businesses.

**Purpose**

The purpose of this study was to examine the relationship between the computer skills needed by business administration graduates as perceived by personnel directors of Fortune 500 businesses headquartered in Ohio, and computer skills currently being taught in Ohio university and college business administration departments.

This study identified the computer skills and computer applications perceived to be necessary by personnel directors, and business administration faculty.
Statement of The Problem

Graf (1985) and Worthington (1985) suggested the business environment is rapidly changing due to rapid technological changes. Jenson (1985) stated the advent of the computer has had a profound impact on all aspects of life; from business, industry, and education, to the home. The results of this study added to the body of knowledge, by informing business departments at Ohio universities and colleges of computer skills perceived important by personnel directors of Ohio businesses. This research can be used by business administration departments to match computer skills being taught with computer skills needed by graduates upon graduation.

The purpose of this study was to examine relationships is between the computer skills perceived as being taught at Ohio colleges and universities and the computer skills perceived as being needed by Ohio businesses.

Research Questions

In order to address the problem of this study, the researcher formulated the following research questions.

1. Is there a difference between the computer skills being taught at Ohio colleges and
universities and the computer skills needed by Ohio businesses?

2. According to personnel directors, what computer skills should business graduates possess for entry-level employment?

3. What is the relationship between the computer skills taught at large colleges and universities and computer skills taught at small colleges and universities?

4. Is there a difference between the type of hardware currently used by companies and the type being used by colleges and universities?

5. Is there a difference between the amount of importance placed on application software by companies and the amount of importance placed on application software by colleges and universities?

Limitations

The following are limitations of this study:

1. Only personnel directors in Fortune 500 companies headquartered in Ohio were asked to participate in the study. Therefore, other individuals may have had other relevant
opinions as to computer skills needed by Ohio
business administration graduates.

2. The results are limited to the reliability
and validity of the questionnaire.

3. The results are limited to the Ohio
geographical area.

4. The results are limited to the time the study
took place.

5. The results are limited to the honesty of the
participants.

6. The results are limited to the perceptions of
the participants.

7. Only colleges and universities in Ohio with
enrollment over 750 were asked to participate
in the study. Individuals at smaller
colleges and universities may have had other
relevant opinions as to computer skills
needed by Ohio business administration
graduates.

**Definition of Terms**

The following terms have been defined to provide
consistency of meaning, and to help the reader
understand essential computer concepts. They are:
1. **Computer** - A programmable electronic device that can store, retrieve, and process data (Mauser and Schwartz, 1986, p. 562).

2. **Skill** - A great ability or proficiency; expertness that comes from training, practice, etc. (Neufeldt & Guralnik 1988).

3. **Application Software** - Computer programs that perform common business or personal tasks; purchased from software vendors (Shelly, Cashman, and Waggoner, 1990 p. 1.10).

4. **Hardware** - The computer's physical components - the machine itself, including chips, circuit boards, keyboard, disk drive, monitor, and other components (Rochester, and Rochester, 1991, p. 15).

5. **Computer Graphics** - A group of programs for visual presentation of information or for the creation of different art forms (McKeown, 1991, p. 77).

6. **Database** - A collection of information that is arranged for easy manipulation and retrieval (McKeown, 1991, p. 81).

7. **Electronic Mail** - The transmittal of messages among computer users over a data communication network (Hicks, 1990, p. 371).


11. **Software** - Reference to all of the programs that control operation of a computer (Baker, Perry, and White, 1991, p. 30).

12. **Integrated Software** - A group of individual software applications, capable of freely exchanging data with each other; typically a combination of word processing, spreadsheet, database, and graphics (Rochester, and Rochester, 1991, p. 208).

13. **Mainframe** - The largest-sized computer; typically used in large companies or
government agencies to process huge amounts of organizational data (Baker, Perry, and White, 1991, p. 21).

14. **Microcomputer** - The smallest computer; used for personal applications in organizations of all sizes; often referred to as a PC (personal computer) (Baker, Perry, and White, 1991, p. 22).

15. **Minicomputer** - A mid-sized computer; used as the main computer for a smaller company or for departmental applications in larger companies (Baker, Perry, and White, 1991, p. 22).

16. **System Software** - All programs including the operating system that are used in controlling the operations of computer equipment (Shelly, Cashman, and Waggoner, 1990, p. 10.2).

17. **Operating System** - A program or set of programs that manage the operations of a computer. The operating system functions as an interface between the user, the applications programs, and the computer hardware (Shelly, Cashman, and Waggoner, 1990, p. 10.3).
18. **Type of Hardware** - Will be used to differentiate between microcomputers, minicomputers and mainframe computers.

19. **Entry-level** - A business administration graduate with no previous experience in business.
CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

Businesses increasingly depend on computers as reported by Mauser & Schwartz (1986). Ullmann (1985) reports that computers are essential in today’s daily business operations, and Curley (1986, p. 16) states that "Students must be prepared for careers for the future in computer applications." With businesses depending on computers, the entry-level personnel hired to work in the business must possess certain computer skills. This study examined what the relationship is between the computer skills being taught at Ohio colleges and universities and the computer skills needed by Ohio businesses.

To develop a theoretical basis, and to acquaint the reader with information that currently exists relating to this study, the researcher identified and reviewed research studies. The process of identifying current literature was achieved through the use of
on-line data searches used to access Dissertations Abstracts International, ERIC, Biography Index, Book Review Digest, Business Periodicals Index, and Readers Guide to Periodical Literature.

The searches provided information that will be analyzed and incorporated in this study. As a result of this data search two concepts were used in this study. The first was what are the computer skills being taught at colleges and universities and what are the computer skills needed by business administration graduates to gain entry-level employment in business. The second was what are the computer applications considered to be important by colleges and universities and what are the computer applications considered to be important by businesses.

This chapter is divided into five sections:

1. Computer Applications
2. Computer Skills
3. Current Education Prospective
   Meeting the needs of the future
   Defining computer literacy
4. Current Business Prospective
5. Summary
Computer Applications

Shelly, Cashman, and Waggoner (1990) cite word processing, spreadsheets, database and graphics applications as the most common types of application software. Desktop publishing and electronic mail are included as two other commonly used forms of application software. Athey, Day & Zmud (1987) suggested electronic mail will help reduce inefficiency in business by reducing the number of business calls not being completed. They estimate that 70 percent of all business calls are not completed, and electronic mail will to help reduce this problem.

The research of Baker, Perry, and White (1991), agrees with that of Shelly, Cashman, and Waggoner and lists word processing, database and spreadsheets as the most important software packages. Further they state that WordPerfect\(^1\), Lotus 1-2-3\(^2\), and dBase\(^3\) are the most popular software packages. Redmann, Seaward and Griffin (1990) provide still another confirmation in suggesting that word processing and spreadsheets are

\(^1\)WordPerfect is a registered trademark of WordPerfect Corporation.

\(^2\)Lotus and 1-2-3 are trademarks of Lotus Development Corporation.

\(^3\)dBase is a trademark of Ashton-Tate.
important computer applications for secretaries; they also add accounting software as important software for secretaries. They predict that there will be a 53% increase in computer usage in the future. Oswalt and Arn (1989) confirm that word processing, spreadsheets, database and graphics are the most important software packages. Finally, Brooks (1986) believes that business education programs should include training related to spreadsheets, graphics and database management.

**Computer Skills**

Matching the computer skills needed by business with what is being taught at the colleges and universities is the second area that was investigated. Results from a study by Cole, Byers and Jolly (1991) show that accounting managers expect more microcomputer skills of new employees than they have in the past. These managers are expecting the microcomputer training to be given by colleges and universities and not through in-house training programs.

Richards (1985, p. 17) reported that "candidates for an office position today must have exposure to business programs or they will find themselves severely handicapped in the job market."
Current Education Prospective: Meeting the Needs of the Future

The *Occupational Outlook Handbook* (1986) predicted that the highest sought after college graduates through the 1990's will be in the area of computing, engineering, and health services.

Omar (1991 p. 36) states "computer education in business schools has gone through different phases of evolution," and cites Yasin & Sayer's (1989) classification of this evolution into four phases. The first phase of the late 1970's was characterized by emphasizing programming skills using mainframe computers. The second phase was characterized by the introduction of microcomputers in the early 1980's. The third phase was characterized by the use of microcomputer-based productivity tools like word processing, spreadsheets and databases to some degree. The fourth phase was characterized by the use of networks as a means of sharing resources. In this phase an introductory course in Management Information Systems or Computer Information Systems would include the use of some of the popular software packages in addition to teaching the hardware, software, systems concepts and the management side of information systems.
James (1987) notes that when teaching computer skills or applications, hands-on activities are crucial regardless of what equipment and software are used.

**Defining Computer Literacy**

A research study by D'Souza (1985) found that a person must be computer literate to function and be successful in our high-technology society.

The researcher reviewed the research of: Ashley (1989); DelPrate (1987); Carter (1988); Clark (1986); and Hognins (1989) and found several authors have defined computer literacy. The following is a summary of computer literacy definitions. Haigh (1985) feels that a computer literacy course should include sections on: using the computer as a tool; determining the need for programming skills; and assessing the socio-political implications of pervasive computer use.

Leuhmann (1984) believes that computer literacy courses should teach students to have the ability to use the computer. He lists three skills a computer literate person should possess. They are: read and write computer programs; select and operate software written by others; and know the limitations of the computer.
Watt (1982) divides computer literacy into the areas of: (1) the ability to control and program computers; (2) the ability to use a variety of pre-programmed computer applications; (3) the ability to use a computer for information retrieval, communication, and problem-solving; and (4) the ability to understand the economic, social, and psychological impact of computers on the individual and our society.

Hunter (1984, p. 45) defines computer literacy as "knowledge a person needs to have about computers in order to function well in his/her job or personal life." This includes a knowledge of: programming; the social impact of computers; the history of computers; computer applications; and available equipment.

Cronan et. al. (1991 p. 17) states that "the demand for skilled workers in computing and technology is continuing to increase in a time when deficiencies in computing literacy are recognized." Opack (1986) states that currently the majority of incoming college students have not received sufficient instruction in the use of microcomputers for word processing. This would suggest that it is the college and universities' responsibility to provide this knowledge to students at the college level. Carter (1988) suggests that with the right word processing background, today's business
student will have a number of new opportunities in the business world.

Current Business Prospective

A study by Oswalt and Arn (1989) found that personnel and human resource managers report difficulty in developing job descriptions and in selecting new employees when knowledge of microcomputer technology is necessary. It is, therefore, necessary for business, and colleges and universities to work together to keep up with the ever changing technology. Lomo-David (1989) recommends that institutions should maintain a cooperative working relationship with area companies in order to determine the needs of companies and tailor their curricula to satisfy these needs. Rickman and Behymer (1989) supports Lomo-David by recommending that periodic surveys should be made to provide information regarding the types of information processing technologies currently used as well as to identify entry-level requirements.

Summary

The review of literature provided a wealth of information dealing with computers and business. The literature supported the importance of word processing,
literature supported the importance of word processing, database, and spreadsheets as the most important application software packages. Other applications included: computer graphics, electronic mail, electronic bulletin boards, and desktop publishing.

Computer skills for college graduates continue to be important for entry-level employment. Without computer skills candidates for employment will be severely handicapped.

Computer literacy for the business graduate is important. Computer literacy for the business graduate includes the ability to use the important application software packages, knowledge of programming, knowledge of the history of computers, and have a working knowledge of the computer system.

The literature also suggests that periodic surveys should be made to provide information regarding the types of information processing technologies currently used as well as to identify entry-level requirements.
CHAPTER III

METHODOLOGY

Introduction

The purpose of this study was to examine the relationship between the computer skills needed by business administration graduates as perceived by personnel directors of Fortune 500 businesses headquartered in Ohio, and computer skills currently perceived as being taught in Ohio university and college business administration departments.

This study identified the computer skills perceived to be necessary by personnel directors. With this information business administration departments can consider curriculum modifications in current courses that contain computer skill training.

Population

There were two target populations for this study: 1) all large businesses in Ohio and 2) all colleges and universities in Ohio.
The accessible populations were all the Fortune 
500 businesses that are headquartered in Ohio and all 
four-year colleges and universities in Ohio listed in 
the Paterson's Guide which have a business 
administration department.

Respondents who completed the instrument for 
business were personnel directors, or their designees. 
The dean or other appropriate official from the 
business department completed the instrument for the 
college or university.

The frame for this study was the accessible 
populations. Generalizations were made only to the 
Fortune 500 businesses headquartered in Ohio. 
Businesses which are not part of the accessible 
population may differ from those that are and cause 
potential frame error if generalizations were to be 
extended to all large businesses. Generalizations can 
also only be made to colleges and universities that are 
listed in the Paterson's Guide. Additional colleges 
and universities may differ and thus cause frame error.

The list of businesses obtained from Fortune 500 was 
inspected to insure that businesses were listed only 
once, thus reducing the chance of selection error.

The list of colleges and universities obtained 
from the Paterson's Guide was also inspected to insure
that colleges and universities were listed only one
time thus reducing the chance of selection error.

Description of the College and University Respondents

Paterson's Guide (1991) lists 49, four-year
colleges and universities in the state of Ohio with
enrollment over 750, which offer a degree in business
administration. A survey was sent to each of these
institutions and 41 (83.6%) were returned. Two (4.8%)
of the respondents held the position of provost or Vice
President, 14 (34.1%) were at the Dean level, which
includes assistant and associate deans, 15 (36.6%) at
the chairperson level, and 8 (19.5%) held the position
of faculty. One (2.4%) person was in the other
category, and one (2.4%) did not answer the question
(Table 1).
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<td>Number of Surveys Returned</td>
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<td></td>
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<td>Dean</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Chairperson</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Faculty</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Missing</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>99.80</td>
<td></td>
</tr>
</tbody>
</table>
In order to achieve consistency among the respondents concerning school enrollment, this researcher used *Peterson's Guide* (1991) to determine the size of each university. The results are listed in Table 2. The arbitrary dichotomy of "large" and "small" was used to categorize institutions by size. There was a natural breaking point at the mean enrollment of 7255. Thus of 36 institutions fell in the small category, while 13 fell in the large category. A total of 29 (80.5%) of the small institutions responded, and 11 (84.6) of the large institutions responded.

The academic area that had the greatest need for computer instruction in this study was in the area of accounting, 17 (41%). Management, which included management information systems had the second greatest demand with 15 (36.6%) of the respondents selecting management (Figure 1).
<table>
<thead>
<tr>
<th>School #</th>
<th>Enrollment</th>
<th>School #</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>815</td>
<td>26</td>
<td>2394</td>
</tr>
<tr>
<td>2</td>
<td>821</td>
<td>27</td>
<td>2550</td>
</tr>
<tr>
<td>3</td>
<td>844</td>
<td>28</td>
<td>2566</td>
</tr>
<tr>
<td>4</td>
<td>866</td>
<td>29</td>
<td>2595</td>
</tr>
<tr>
<td>5</td>
<td>890</td>
<td>30</td>
<td>2952</td>
</tr>
<tr>
<td>6</td>
<td>930</td>
<td>31</td>
<td>3008</td>
</tr>
<tr>
<td>7</td>
<td>1006</td>
<td>32</td>
<td>3946</td>
</tr>
<tr>
<td>8</td>
<td>1061</td>
<td>33</td>
<td>4391</td>
</tr>
<tr>
<td>9</td>
<td>1122</td>
<td>34</td>
<td>4407</td>
</tr>
<tr>
<td>10</td>
<td>1180</td>
<td>35</td>
<td>4713</td>
</tr>
<tr>
<td>11</td>
<td>1257</td>
<td>36</td>
<td>6477</td>
</tr>
<tr>
<td>12</td>
<td>1261</td>
<td>37</td>
<td>8386</td>
</tr>
<tr>
<td>13</td>
<td>1307</td>
<td>38</td>
<td>11284</td>
</tr>
<tr>
<td>14</td>
<td>1359</td>
<td>39</td>
<td>14864</td>
</tr>
<tr>
<td>15</td>
<td>1365</td>
<td>40</td>
<td>16157</td>
</tr>
<tr>
<td>16</td>
<td>1444</td>
<td>41</td>
<td>16500</td>
</tr>
<tr>
<td>17</td>
<td>1457</td>
<td>42</td>
<td>17423</td>
</tr>
<tr>
<td>18</td>
<td>1523</td>
<td>43</td>
<td>18043</td>
</tr>
<tr>
<td>19</td>
<td>1526</td>
<td>44</td>
<td>18534</td>
</tr>
<tr>
<td>20</td>
<td>1799</td>
<td>45</td>
<td>23727</td>
</tr>
<tr>
<td>21</td>
<td>1942</td>
<td>46</td>
<td>23926</td>
</tr>
<tr>
<td>22</td>
<td>1966</td>
<td>47</td>
<td>28967</td>
</tr>
<tr>
<td>23</td>
<td>2013</td>
<td>48</td>
<td>30731</td>
</tr>
<tr>
<td>24</td>
<td>2315</td>
<td>49</td>
<td>52895</td>
</tr>
<tr>
<td>25</td>
<td>2340</td>
<td>Mean</td>
<td>7254.755</td>
</tr>
</tbody>
</table>
Figure 1
Need for Computer Instruction By Department
The majority of the students experience a computer course before they graduate. Thirty six (87.8%) of the respondents replied that between 76% and 100% of their students experience a computer course before they graduate. None of the respondents replied that less than 25% of their students experienced a computer class before graduation. Table 3 identifies the percent of students who experience a computer course before graduation.

Table 3
Percent of Students That Experience a Computer Course Before Graduation

<table>
<thead>
<tr>
<th>Percent of Students</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 to 25 %</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>26 to 50 %</td>
<td>3</td>
<td>7.3</td>
</tr>
<tr>
<td>51 to 75 %</td>
<td>2</td>
<td>4.8</td>
</tr>
<tr>
<td>76 to 100 %</td>
<td>36</td>
<td>87.8</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>99.9</td>
</tr>
</tbody>
</table>
The computer has had an effect on the instructional process for students in business administration departments in Ohio. Four different responses were solicited concerning the effect the computer has had in the instructional process of students. None of the respondents selected the first two responses "none" and "very little". Twenty three (56.1%) suggested that the computer has had "some effect" in the instructional process while 18 (43.9%) responded that the computer has had "a great deal" of effect in the instructional process. Table 4 describes the type of effect encountered.

<table>
<thead>
<tr>
<th>Effect</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Very Little</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Some Effect</td>
<td>23</td>
<td>56.1</td>
</tr>
<tr>
<td>A Great Deal</td>
<td>18</td>
<td>43.9</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4

The Effect the Computer Had in the Instructional Process of Students In Business Administration Departments
Respondents from the universities were asked to rank the computer competencies they felt were the most important to students. The three categories were Computer Literacy, Computer Programming and Computer Applications. Fifteen (36.6%) of the respondents ranked computer literacy as the most important computer competency and 15 (36.6%) ranked computer literacy as the least important computer competency. Twenty three (56.1%) of the respondents ranked computer programming as the most important computer competency, while 17 (41.5%) ranked computer programming as the least important computer competency. Twenty nine (70.7%) of the respondents ranked computer applications as being in the middle when ranking computer applications as an important computer competency. Table 5 provides a summary of the means for each of these responses.

Thirty nine (95%) of the university respondents felt that businesses would provide additional computer training to business administration graduates after being employed (Table 6).
<table>
<thead>
<tr>
<th>Competency</th>
<th>Number of Top Rankings</th>
<th>Number of Middle Rankings</th>
<th>Number of Low Rankings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Literacy</td>
<td>15</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Computer Programming</td>
<td>23</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Computer Applications</td>
<td>3</td>
<td>29</td>
<td>9</td>
</tr>
</tbody>
</table>
Table 6

Frequency of Universities That Feel Businesses Will Provide Additional Training for Entry-Level Employees

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>39</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
</tbody>
</table>

Description of the Businesses Responding

"Fortune" (April, 1991) lists 37 Fortune 500 companies headquartered in the state of Ohio. The survey instrument was sent to each of these companies and 30 (81%) were returned; 26 of which were determined to be usable. One of the companies indicated that the company was going out of business and indicated that current information would not be pertinent. Two other companies responded by indicating that because of the number of surveys that they receive, they could not participate.

Two (6.7%) of the respondents listed retailing as a major type of business, one (3.3%) listed service as their main type of business, and one (3.3%) indicated
financial as business type, while 22 (73.3%) listed manufacturing (Table 7).

The majority of the respondents 12 (46.2%) selected "Other" as the response for the department which had the greatest demand for computer applications. These 12 respondents specified "Other" as being all departments. The department with the second highest demand in this study was the accounting department with 11 (42.3%) of the respondents selecting this option (Table 8).
Table 7  
Description of the Businesses Responding

<table>
<thead>
<tr>
<th>Variable</th>
<th>Percent</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Surveys Returned</td>
<td>81.1</td>
<td>30</td>
</tr>
<tr>
<td>Major type of business</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retail</td>
<td>6.7</td>
<td>2</td>
</tr>
<tr>
<td>Service</td>
<td>3.3</td>
<td>1</td>
</tr>
<tr>
<td>Financial</td>
<td>3.3</td>
<td>1</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>73.3</td>
<td>22</td>
</tr>
<tr>
<td>Unusable</td>
<td>13.3</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>99.90</td>
<td>30.00</td>
</tr>
</tbody>
</table>
Table 8

Department With the Greatest Demand For Computer Applications

<table>
<thead>
<tr>
<th>Department</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting</td>
<td>11</td>
<td>42.3</td>
</tr>
<tr>
<td>Management</td>
<td>2</td>
<td>7.7</td>
</tr>
<tr>
<td>Human Resources</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Finance</td>
<td>1</td>
<td>3.8</td>
</tr>
<tr>
<td>Other.. (All)</td>
<td>12</td>
<td>46.2</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>100</td>
</tr>
</tbody>
</table>

Thirteen (50%) of the respondents indicated that between 76 and 100 percent of their employees use the computer as part of their job (Table 9).
### Table 9

Percent of Employees That Use a Computer as Part of Their Job

<table>
<thead>
<tr>
<th>Percent of Employees</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 to 25 %</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>26 to 50 %</td>
<td>5</td>
<td>19.2</td>
</tr>
<tr>
<td>51 to 75 %</td>
<td>7</td>
<td>26.9</td>
</tr>
<tr>
<td>76 to 100 %</td>
<td>13</td>
<td>50.0</td>
</tr>
<tr>
<td>No Response</td>
<td>1</td>
<td>3.8</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>99.9</td>
</tr>
</tbody>
</table>

The majority of the respondents 22 (84.6%) indicated that the computer had "some effect" in the operating procedure of the business activity (Table 10).
Table 10

<table>
<thead>
<tr>
<th>Effect</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Very Little</td>
<td>2</td>
<td>7.7</td>
</tr>
<tr>
<td>Some Effect</td>
<td>22</td>
<td>84.6</td>
</tr>
<tr>
<td>A Great Deal</td>
<td>2</td>
<td>7.7</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>100</td>
</tr>
</tbody>
</table>

Respondents from the businesses were asked to rate the computer competencies they felt were the most important to students. The three categories were Computer Literacy, Computer Programming and Computer Applications. Eighteen (69.2%) of the respondents ranked computer programming as the least important computer competency and none (0) of the respondents ranked computer applications as the least important computer application. Table 11 provides a summary of for each of these responses.
<table>
<thead>
<tr>
<th>Competency</th>
<th>Number of Top Rankings</th>
<th>Number of Middle Rankings</th>
<th>Number of Low Rankings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Literacy</td>
<td>11</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Computer Programming</td>
<td>7</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Computer Applications</td>
<td>8</td>
<td>18</td>
<td>0</td>
</tr>
</tbody>
</table>

Seventeen (65.4%) of the business respondents felt that additional computer training is necessary for business administration graduates after being employed (Table 12).

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>17</td>
</tr>
<tr>
<td>No</td>
<td>8</td>
</tr>
</tbody>
</table>
Instrument Development

The researcher reviewed the literature, and used personal opinion to determine important characteristics to include in the instrument.

Two instruments were used in this study; One was used for Fortune 500 companies and the other for four-year colleges and universities in Ohio that offer a degree in business administration. Each instrument contained three parts: 1) demographic information, 2) a Likert-type scale to measure the perceived skills needed of business administration graduates, and 3) a Likert-type scale to allow the respondent to address the importance of several application software packages. The Likert responses included: one, extremely unnecessary; two, unnecessary; three, undecided; four, necessary; and five, extremely necessary. An example of this scale is:

<table>
<thead>
<tr>
<th>Extremely Unnecessary</th>
<th>Extremely Necessary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

The parts were analyzed independently and in groups.
An instrument developed by Carter (1988) was consulted in developing the instruments for this study (Appendix E).

Validity/Internal Consistency

The instruments were tested for validity using content validity and face validity. Content and face validity was established by a panel of experts (Appendix I). The experts included four professors, one whom had expertise in measurement. Three other professors were asked to evaluate the instruments on the subject matter. One business person was also on the panel of experts. The experts gave feedback on wording, clarity, appropriateness for population, content, and face validity. With the feedback from the panel of experts, the researcher eliminated poor items and unclear questions were reworded (Norland, 1991).

The reliability for this instrument was tested using Cronbach's Alpha of the SAS Statistical Package at the Ohio State University. The reliability was tested on Parts Two and Three, as well as a test on the
entire instrument. The Cronbach’s Alpha values for the instrument were: Part Two (questions 11 through 29), 0.796; Part Three (questions 30 through 36), 0.762; and the entire instrument 0.841.

**Data Collection Procedures**

Data for this study were collected using mailed questionnaires. The data collection procedure followed suggestions by Norland (1991, p. 159-161). The suggestions are described in the following paragraphs.

The initial mailing of the questionnaire packet included a cover letter, co-signed by the advisor of the study, discussing why the respondent is important, the significance of the study, the promise of confidentiality, and an explanation of the code number on the questionnaire. A deadline date along with instructions on what to do if questions arise and a thank you was also included in the cover letter. The packet included a self-addressed stamped return envelope (Appendix A, B, F, G). Thirty-one (63%) colleges and universities responded to the first mailing. Twenty (54%) of the businesses responded to this first mailing.

A second packet was sent to the non-respondents. This packet included a cover letter, the survey
instrument and a self-addressed stamped return envelope. Nine (18%) colleges and universities responded to the second mailing. Six (16%) of the businesses responded to this second mailing (Appendix C, D, F, G).

A third packet was sent to the remaining non-respondents. This packet was followed with a telephone call to the potential respondent. This packet also included a cover letter, the survey instrument and a self-addressed, stamped return envelope. The telephone call asked the potential respondent to please complete the instrument and return it to the researchers (Appendix C, D, F, G). One (2%) university responded to the third data collection attempt. Four (11%) of the businesses responded to this third data collection attempt.

A total of 40 (83%) of the colleges and universities responded, and 30 (81%) of the businesses responded. Kerlinger (1973) indicates that with more than an 80% response rate it is not necessary to address the non-respondents.
Data Analysis

The data collected were analyzed using: The SAS statistical package at The Ohio State University; Lotus 1-2-3; and a BASIC program written by the researcher. Statistical tests included: t-tests, frequency distributions, confidence intervals, and Pearson Product Moment Correlation Coefficients.

The data were reviewed and entered into the spreadsheet Lotus 1-2-3. The information was saved as an ASCII file which was used with the BASIC program (Appendix K) to plot histograms. This ASCII file was then uploaded to the Ohio State University mainframe computer. The alpha level was set at 0.05.

*Lotus and 1-2-3 are trademarks of Lotus Development Corporation.*
CHAPTER IV
ANALYSIS OF THE DATA

Introduction

The primary purpose of this study was to examine the relationship between the computer skills needed by business administration graduates as perceived by personnel directors of Fortune 500 businesses headquartered in Ohio, and computer skills currently being taught in Ohio university and college business administration departments.

The following research questions were formulated for this study:

1. Is there a difference between the computer skills being taught at Ohio colleges and universities and the computer skills needed by Ohio businesses?

2. According to personnel directors what computer skills should business graduates possess for entry-level employment?
3. What is the relationship between the computer skills taught at large colleges and universities and computer skills taught at small colleges and universities?

4. Is there a difference between the type of hardware currently used by companies and the type being used by colleges and universities?

5. Is there a difference between the amount of importance placed on application software by companies and the amount of importance placed on application software by colleges and universities?

Research question number two will be analyzed using the Pearson Product Moment Correlation Coefficient. The standard that will be used to interpret the data is based upon the criteria shown in Table 13.
TABLE 13
INTERPRETATION OF RELATIONSHIPS

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>.70 or higher</td>
<td>Very strong relationship</td>
</tr>
<tr>
<td>.50 to .69</td>
<td>Substantial relationship</td>
</tr>
<tr>
<td>.30 to .49</td>
<td>Moderate relationship</td>
</tr>
<tr>
<td>.10 to .29</td>
<td>Low relationship</td>
</tr>
<tr>
<td>.01 to .09</td>
<td>Negligible relationship</td>
</tr>
</tbody>
</table>


Discussion of Findings

The first research question: **Is there a difference between the computer skills being taught at Ohio colleges and universities and the computer skills needed by Ohio businesses?** was analyzed using means, standard deviations, standard error, confidence intervals, and the t-test. Questions 11 through 29 were analyzed individually and as a group, this group mean was used to answer the research question.

Table 14 lists the question number, mean, standard deviation, standard error and confidence intervals for questions 11 through 29 (Appendix F, G) for the university respondents. Question number 19, "students will develop an introductory background in programming"
concepts had the lowest standard deviation (.5500) and had a mean over 4.000.
<table>
<thead>
<tr>
<th>Question</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Std. Error</th>
<th>95% C. I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Manipulate desktop publishing</td>
<td>2.756</td>
<td>.9690</td>
<td>.1513</td>
<td>2.46 3.05</td>
</tr>
<tr>
<td>12. Understand computer history</td>
<td>2.805</td>
<td>.9279</td>
<td>.1449</td>
<td>2.52 3.09</td>
</tr>
<tr>
<td>15. Understand business changes caused by technology</td>
<td>4.122</td>
<td>.6781</td>
<td>.1059</td>
<td>3.91 4.33</td>
</tr>
<tr>
<td>16. Interacting with software</td>
<td>4.475</td>
<td>.7506</td>
<td>.1187</td>
<td>4.24 4.71</td>
</tr>
<tr>
<td>17. Evaluation of software</td>
<td>3.488</td>
<td>.8100</td>
<td>.1265</td>
<td>3.24 3.74</td>
</tr>
<tr>
<td>18. Background in programming</td>
<td>2.707</td>
<td>.8439</td>
<td>.1318</td>
<td>2.45 2.97</td>
</tr>
<tr>
<td>19. Understand role of computer in solving problems</td>
<td>4.439</td>
<td>.5500</td>
<td>.0859</td>
<td>4.27 4.61</td>
</tr>
<tr>
<td>20. Understand the programming cycle</td>
<td>2.895</td>
<td>1.0775</td>
<td>.1682</td>
<td>2.48 3.13</td>
</tr>
<tr>
<td>21. Use of conditional &amp; unconditional operations</td>
<td>2.800</td>
<td>.9661</td>
<td>.1528</td>
<td>2.50 3.10</td>
</tr>
<tr>
<td>22. Make decision to solve problem</td>
<td>4.439</td>
<td>.5937</td>
<td>.0927</td>
<td>4.26 4.62</td>
</tr>
<tr>
<td>23. Understanding of computer graphics</td>
<td>3.707</td>
<td>.8138</td>
<td>.1271</td>
<td>3.46 3.96</td>
</tr>
<tr>
<td>24. Proficiency with DOS</td>
<td>4.122</td>
<td>.9797</td>
<td>.1530</td>
<td>3.82 4.42</td>
</tr>
<tr>
<td>25. Understand word processing features</td>
<td>4.439</td>
<td>.7433</td>
<td>.1161</td>
<td>4.21 4.67</td>
</tr>
<tr>
<td>26. Understand electronic spreadsheet application</td>
<td>4.634</td>
<td>.5465</td>
<td>.0838</td>
<td>4.47 4.80</td>
</tr>
<tr>
<td>27. Design a database</td>
<td>3.805</td>
<td>.9803</td>
<td>.1531</td>
<td>3.50 4.11</td>
</tr>
<tr>
<td>28. Identify components of integrated software packages</td>
<td>3.550</td>
<td>.7828</td>
<td>.1238</td>
<td>3.31 3.79</td>
</tr>
<tr>
<td>29. Identify and generate graphs</td>
<td>3.878</td>
<td>.7481</td>
<td>.1168</td>
<td>3.65 4.11</td>
</tr>
</tbody>
</table>

Std. Error = Standard Error
Std. Dev. = Standard Deviation
95% C.I. = 95% Confidence Interval
Table 15 lists the question number, mean, standard deviation, standard error and confidence intervals for questions 11 through 29 (Appendix F, G) for the business respondents. Question number 24, "students will demonstrate proficiency in using DOS programs to format, copy, and view file directories" had the lowest standard deviation (.4019) and had a mean over 4.000.
<table>
<thead>
<tr>
<th>Question</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Std. Error</th>
<th>95% C.I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Manipulate desktop publishing</td>
<td>3.038</td>
<td>.9992</td>
<td>.1959</td>
<td>2.65</td>
</tr>
<tr>
<td>12. Understand computer history</td>
<td>2.692</td>
<td>1.010</td>
<td>.1982</td>
<td>2.30</td>
</tr>
<tr>
<td>15. Understand business changes caused by technology</td>
<td>3.769</td>
<td>.7103</td>
<td>.1393</td>
<td>3.50</td>
</tr>
<tr>
<td>16. Interacting with software</td>
<td>4.231</td>
<td>.5870</td>
<td>.1151</td>
<td>4.01</td>
</tr>
<tr>
<td>17. Evaluation of software</td>
<td>3.385</td>
<td>.8521</td>
<td>.1671</td>
<td>3.06</td>
</tr>
<tr>
<td>18. Background in programming</td>
<td>3.385</td>
<td>.7524</td>
<td>.1476</td>
<td>3.10</td>
</tr>
<tr>
<td>20. Understand the programming cycle</td>
<td>3.346</td>
<td>1.056</td>
<td>.2071</td>
<td>2.94</td>
</tr>
<tr>
<td>21. Use of conditional &amp; unconditional operations</td>
<td>3.080</td>
<td>.8622</td>
<td>.1724</td>
<td>2.74</td>
</tr>
<tr>
<td>22. Make decisions to solve problems</td>
<td>4.385</td>
<td>.8521</td>
<td>.1671</td>
<td>4.06</td>
</tr>
<tr>
<td>23. Understanding of computer graphics</td>
<td>3.731</td>
<td>.5334</td>
<td>.1046</td>
<td>3.53</td>
</tr>
<tr>
<td>24. Proficiency with DOS</td>
<td>4.192</td>
<td>.4019</td>
<td>.0788</td>
<td>4.04</td>
</tr>
<tr>
<td>25. Understand word processing features</td>
<td>4.308</td>
<td>.6177</td>
<td>.1211</td>
<td>4.07</td>
</tr>
<tr>
<td>27. Design a database</td>
<td>3.462</td>
<td>.9479</td>
<td>.1859</td>
<td>3.10</td>
</tr>
<tr>
<td>28. Identify components of integrated software packages</td>
<td>3.520</td>
<td>.9183</td>
<td>.1837</td>
<td>3.16</td>
</tr>
<tr>
<td>29. Identify and generate graphs</td>
<td>3.769</td>
<td>.5870</td>
<td>.1151</td>
<td>3.54</td>
</tr>
</tbody>
</table>

Std. Error = Standard Error  
Std. Dev. = Standard Deviation  
95% C.I. = 95% Confidence Interval
A t-test comparing the type of respondent (business or university) found responses from universities and business to be significantly different at the 0.05 level for question 15, "students will develop an understanding of the changes which are occurring in business as a result of technology," question 18, "students will develop an introductory background in programming concepts," question 20, "students will develop an understanding of the program cycle: Design, Coding, Testing, and Documentation," and question 26, students will develop an understanding of the basic use and application of an electronic spreadsheet." (Appendix F, G and Table 16)

<table>
<thead>
<tr>
<th>Question</th>
<th>t value</th>
<th>Prob. Level</th>
<th>95% C. I. Between the Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>2.0371</td>
<td>.0457</td>
<td>.1460</td>
</tr>
<tr>
<td>18</td>
<td>-3.3355</td>
<td>.0014</td>
<td>-.8669</td>
</tr>
<tr>
<td>20</td>
<td>-2.0191</td>
<td>.0476</td>
<td>-.7537</td>
</tr>
<tr>
<td>26</td>
<td>2.1029</td>
<td>.0394</td>
<td>.1526</td>
</tr>
</tbody>
</table>
Positive t value indicate that the education mean is significantly higher than the business mean, while a negative t values indicate that the business mean is significantly higher than the education mean.

To answer the first research question a new value was calculated. This value was the mean of questions 11 through 29, and was analyzed by type of respondent. The t value for this comparison was -0.1856 with a probability of 0.8534 (Table 17). Therefore, it can be concluded that there is no significant difference between the computer skills taught at Ohio colleges and universities and the computer skills perceived to be needed by Ohio businesses.
<table>
<thead>
<tr>
<th>Respondent</th>
<th>Number of Respondents</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t value</th>
<th>Probability Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business</td>
<td>41</td>
<td>3.706</td>
<td>.3832</td>
<td>-.1856</td>
<td>.8534</td>
</tr>
<tr>
<td>Education</td>
<td>26</td>
<td>3.723</td>
<td>.3552</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The second research question: According to personnel directors what computer skills should business graduates possess for entry-level employment? was analyzed ranking questions 11 through 29 by mean, standard deviation, standard error and confidence intervals (Table 18).

According to the information listed in Table 18 the most important skill for a business graduate to possess for entry-level employment is question # 22, "based on a variety of circumstances, students will be able to make decisions necessary to solve problems." The mean for this question was 4.385 with 95% confidence that the actual mean falls between 4.06 and 4.71. Other important skills (questions 26 and 25) include an understanding of electronic spreadsheets, and word processors.

The lowest means were for questions 21, 11, and 12. These questions focused on using conditional and unconditional operations, desktop publishing, and the history and trends of computers.
<table>
<thead>
<tr>
<th>Question</th>
<th>Mean</th>
<th>Std. Dev</th>
<th>Std. Error</th>
<th>95% C. I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>22. Make decisions to solve problems</td>
<td>4.385</td>
<td>.8521</td>
<td>.1671</td>
<td>4.06</td>
</tr>
<tr>
<td>25. Understand word processing features</td>
<td>4.308</td>
<td>.6177</td>
<td>.1211</td>
<td>4.07</td>
</tr>
<tr>
<td>16. Interacting with software</td>
<td>4.231</td>
<td>.5870</td>
<td>.1151</td>
<td>4.01</td>
</tr>
<tr>
<td>24. Proficiency with DOS</td>
<td>4.192</td>
<td>.4019</td>
<td>.0788</td>
<td>4.04</td>
</tr>
<tr>
<td>19. Understand role of computer in solving problems</td>
<td>4.154</td>
<td>.6127</td>
<td>.1202</td>
<td>3.92</td>
</tr>
<tr>
<td>14. Keyboarding proficiency</td>
<td>4.0</td>
<td>.6883</td>
<td>.1350</td>
<td>3.81</td>
</tr>
<tr>
<td>13. Understand computer components</td>
<td>3.807</td>
<td>.8494</td>
<td>.1665</td>
<td>3.48</td>
</tr>
<tr>
<td>15. Understand business changes caused by technology</td>
<td>3.769</td>
<td>.7103</td>
<td>.1393</td>
<td>3.50</td>
</tr>
<tr>
<td>29. Identify and generate graphs</td>
<td>1.769</td>
<td>.5870</td>
<td>.1151</td>
<td>3.54</td>
</tr>
<tr>
<td>23. Understanding of computer graphics</td>
<td>3.731</td>
<td>.5334</td>
<td>.1046</td>
<td>3.53</td>
</tr>
<tr>
<td>28. Identify components of integrated software packages</td>
<td>3.520</td>
<td>.9183</td>
<td>.1837</td>
<td>3.16</td>
</tr>
<tr>
<td>27. Design a database</td>
<td>3.462</td>
<td>.9479</td>
<td>.1859</td>
<td>3.10</td>
</tr>
<tr>
<td>17. Evaluation of software</td>
<td>3.385</td>
<td>.8521</td>
<td>.1671</td>
<td>3.06</td>
</tr>
<tr>
<td>18. Background in programming</td>
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<td>.7524</td>
<td>.1476</td>
<td>3.10</td>
</tr>
<tr>
<td>20. Understand the programming cycle</td>
<td>3.346</td>
<td>1.056</td>
<td>.2071</td>
<td>2.94</td>
</tr>
<tr>
<td>21. Use of conditional &amp; unconditional operations</td>
<td>3.080</td>
<td>.8622</td>
<td>.1724</td>
<td>2.74</td>
</tr>
<tr>
<td>11. Manipulate desktop publishing</td>
<td>3.038</td>
<td>.9992</td>
<td>.1959</td>
<td>2.65</td>
</tr>
<tr>
<td>12. Understand computer history</td>
<td>2.692</td>
<td>1.010</td>
<td>.1982</td>
<td>2.30</td>
</tr>
</tbody>
</table>

Std. Error = Standard Error
Std. Dev. = Standard Deviation
95% C.I. = 95% Confidence Interval
The third research question: What is the relationship between the computer skills taught at large colleges and universities and computer skills taught at small colleges and universities? was analyzed using means and the Pearson Product Moment Correlation Coefficient. Questions number 11 through 29 were analyzed with the second demographic question, size of the university. Analysis was also computed by comparing the mean of questions 11 through 29 with the size of the university, this mean was used to answer the third research question.

The results of the Pearson Product Moment Correlation Coefficient indicated that there were no significant correlations between computer skills taught at large colleges and universities and computer skills taught at small colleges and universities.

Using the Pearson Product Moment Correlation Coefficient between the mean of questions 11 through 29 and size of the university the researcher found no significant correlation.

The fourth research question: Is there a difference between the type of hardware currently used by companies and the type being used by colleges and universities? was analyzed with a t-test comparing Fortune 500 companies headquartered in Ohio, and Ohio
colleges and universities with question number six on
the educational survey (Appendix G) and question number
five on the business survey (Appendix F) "What types of
computers are you currently using?"

The responses on the survey instrument were:
A. MICROCOMPUTER; B. MINICOMPUTER; and C. MAINFRAME.
As expected the respondents selected more than one type
of computer, therefore, the results were coded in the
following seven point order: 1. MICROCOMPUTER; 2.
MINICOMPUTER; 3. MAINFRAME; 4. MICROCOMPUTER AND
MINICOMPUTER; 5. MICROCOMPUTER AND MAINFRAME; 6.
MINICOMPUTER AND MAINFRAME; and 7. ALL.

Nineteen (46.3%) of the university respondents
indicated that microcomputers were the only type of
computer used. One (2.4%) responded that their
institution used all three types of computers. Table
19 provides the frequency distribution and percentages
for the type of computers used by universities.

In contrast to the university respondents four
(14.4%) of the business respondents indicated that
microcomputers were the only type of computer used, and
14 (53.8%) responded by indicating that their company
used all three types of computers. Table 20 provides
the frequency distribution and percentages for the type
of computers used by business.
### Table 19
**Types of Computers Currently Used by Universities**

<table>
<thead>
<tr>
<th>Computer Type</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microcomputer</td>
<td>19</td>
<td>46.3</td>
</tr>
<tr>
<td>Minicomputer</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mainframe</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Microcomputer and Minicomputer</td>
<td>7</td>
<td>17.1</td>
</tr>
<tr>
<td>Microcomputer and Mainframe</td>
<td>14</td>
<td>34.1</td>
</tr>
<tr>
<td>Minicomputer and Mainframe</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>All Three Types</td>
<td>1</td>
<td>2.4</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>99.9</td>
</tr>
</tbody>
</table>

### Table 20
**Types of Computers Currently Used by Business**

<table>
<thead>
<tr>
<th>Computer Type</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microcomputer</td>
<td>4</td>
<td>15.4</td>
</tr>
<tr>
<td>Minicomputer</td>
<td>1</td>
<td>3.8</td>
</tr>
<tr>
<td>Mainframe</td>
<td>2</td>
<td>7.7</td>
</tr>
<tr>
<td>Microcomputer and Minicomputer</td>
<td>1</td>
<td>3.8</td>
</tr>
<tr>
<td>Microcomputer and Mainframe</td>
<td>4</td>
<td>15.4</td>
</tr>
<tr>
<td>Minicomputer and Mainframe</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>All Three Types</td>
<td>14</td>
<td>53.8</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>99.9</td>
</tr>
</tbody>
</table>
Results of the t-test indicate that there is a significant difference at the 0.05 significance level, between the type of hardware used by companies, and the type of hardware used by universities (Table 21).

<table>
<thead>
<tr>
<th>Question</th>
<th>t value</th>
<th>Prob. Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Hardware</td>
<td>-3.497</td>
<td>.0009</td>
</tr>
</tbody>
</table>

The fifth research question: **Is there a difference between the amount of importance placed on application software by companies and the amount of importance placed on application software by colleges and universities?** was analyzed using frequency distributions, means, standard deviations, confidence intervals, and t-test.

Questions 30 through 36 "rate the importance of word processing, electronic spreadsheets, database management, computer graphics, electronic mail, electronic bulletin boards, and desktop publishing"
were used to answer this question. These questions were analyzed individually, and as a group.

Table 22 lists the mean, standard deviation, standard error and confidence intervals for questions 30 through 36 for the university respondents. Question 31 (importance of electronic spreadsheets) had the highest mean of the application software questions for the university respondents. The mean was 4.756 with a standard deviation of .6699.

Table 23 lists the mean, standard deviation, standard error and confidence intervals for questions 30 through 36 for the business respondents. Question 30 (importance of word processing) had the highest mean of the application software questions for the business respondents. The mean was 4.585 with a standard deviation of .6699.

A t-test comparing the type of respondent (business or university) found question 32 (importance of database management) to be significantly different at the .05 level (Appendix F, G and Table 24).
<table>
<thead>
<tr>
<th>Question - the importance of</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Std. Error</th>
<th>95% C. I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>30. Word processing</td>
<td>4.585</td>
<td>0.6699</td>
<td>0.1046</td>
<td>4.38</td>
</tr>
<tr>
<td>31. Electronic Spreadsheets</td>
<td>4.756</td>
<td>0.4889</td>
<td>0.0764</td>
<td>4.61</td>
</tr>
<tr>
<td>32. Database management</td>
<td>4.341</td>
<td>0.6932</td>
<td>0.1083</td>
<td>4.13</td>
</tr>
<tr>
<td>33. Computer graphics</td>
<td>3.878</td>
<td>0.7482</td>
<td>0.1168</td>
<td>3.65</td>
</tr>
<tr>
<td>34. Electronic mail</td>
<td>3.634</td>
<td>0.8293</td>
<td>0.1295</td>
<td>3.38</td>
</tr>
<tr>
<td>35. Electronic bulletin boards</td>
<td>3.244</td>
<td>0.8883</td>
<td>0.1387</td>
<td>2.97</td>
</tr>
<tr>
<td>36. Desktop publishing</td>
<td>3.146</td>
<td>0.9370</td>
<td>0.1463</td>
<td>2.86</td>
</tr>
</tbody>
</table>

Std. Error = Standard Error  
Std. Dev. = Standard Deviation  
95% C.I. = 95% Confidence Interval
<table>
<thead>
<tr>
<th>Question</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Std. Error</th>
<th>95% C.I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>30. Word processing</td>
<td>4.585</td>
<td>.6699</td>
<td>4.046</td>
<td>4.79</td>
</tr>
<tr>
<td>31. Electronic spreadsheets</td>
<td>4.500</td>
<td>.5831</td>
<td>4.22</td>
<td>4.78</td>
</tr>
<tr>
<td></td>
<td>3.923</td>
<td>.8449</td>
<td>4.25</td>
<td>4.11</td>
</tr>
<tr>
<td>32. Database management</td>
<td>3.846</td>
<td>.8748</td>
<td>3.60</td>
<td>4.17</td>
</tr>
<tr>
<td></td>
<td>3.808</td>
<td>.9389</td>
<td>3.59</td>
<td>4.17</td>
</tr>
<tr>
<td>33. Computer graphics</td>
<td>3.115</td>
<td>.9519</td>
<td>3.45</td>
<td>4.48</td>
</tr>
<tr>
<td></td>
<td>3.115</td>
<td>.9519</td>
<td>3.45</td>
<td>4.48</td>
</tr>
<tr>
<td>34. Electronic bulletin boards</td>
<td>3.038</td>
<td>.8237</td>
<td>3.72</td>
<td>3.35</td>
</tr>
<tr>
<td></td>
<td>3.038</td>
<td>.8237</td>
<td>3.72</td>
<td>3.35</td>
</tr>
</tbody>
</table>
Table 24
Results of a t-test Comparing Type of Respondent and the Database Question

<table>
<thead>
<tr>
<th>Question</th>
<th>t value</th>
<th>Prob. Level</th>
<th>95% C. I. Between the Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>2.2100</td>
<td>.0306</td>
<td>.2212</td>
</tr>
</tbody>
</table>

A positive t value indicates that the education mean is significantly higher than the business mean.

To answer the fifth research question the mean of questions 30 through 36 was calculated and analyzed by type of respondent (business and education). The t value for this comparison was 1.101 with a probability of 0.2718 (Table 25). Therefore, it can be concluded that there is no significant difference between the importance of computer application software and the type of respondent (business and education).
<table>
<thead>
<tr>
<th>Respondent</th>
<th>Number of Respondents</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t value</th>
<th>Probability Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business</td>
<td>41</td>
<td>3.971</td>
<td>.5101</td>
<td>1.108</td>
<td>.2718</td>
</tr>
<tr>
<td>Education</td>
<td>26</td>
<td>3.802</td>
<td>.4800</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Additional Findings

Further analysis of significant relationships between corresponding questions

To provide greater insight some additional analysis were made. The researcher also investigated the relationship between the skills questions (11 through 29) with the applications questions (30 through 36). Statistical analysis for this included the Pearson Product Moment Correlation Coefficient. The researcher used the scale in Table 26 to evaluate the perceptions of the college and business respondents.

<table>
<thead>
<tr>
<th>4.51 and greater</th>
<th>Extremely Necessary</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.51 to 4.50</td>
<td>Necessary</td>
</tr>
<tr>
<td>2.51 to 3.50</td>
<td>Undecided</td>
</tr>
<tr>
<td>1.51 to 2.50</td>
<td>Unnecessary</td>
</tr>
<tr>
<td>1.50 and lower</td>
<td>Extremely Unnecessary</td>
</tr>
</tbody>
</table>
The researcher used question 11 "Students will develop the ability to manipulate a desktop publishing package" and question 36, "Rate the importance of desktop publishing" for the correlation.

Question 11 had a substantial relationship with question 36 ($p < .01$) (Appendix F, G, and Table 27). The mean for question 11 was 2.76 and the mean for question 36 was 3.14, therefore, even though this finding indicates that there is a substantial relationship between the ability to manipulate a desktop publishing package and the importance of desktop publishing the respondents are undecided as to desktop publishing's importance.

<table>
<thead>
<tr>
<th>Table 27</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship Between Ability to Manipulate a Desktop Publishing Package and Importance of Desktop Publishing</td>
</tr>
<tr>
<td>Number of Cases</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>67</td>
</tr>
</tbody>
</table>
In addition, question 23 "Students will develop a basic understanding of the use of computer graphics" and question 33 "Rate the importance of computer graphics" was analyzed using the Pearson Product Moment Correlation Coefficient.

Question 23 had a substantial relationship with question 33 ($p < .01$) (Appendix F, G, and Table 28). The mean for question 23 was 3.71 and the mean for question 33 was 3.88. This finding indicates that those who felt it necessary that students develop a basic understanding of the use of computer graphics tend to feel computer graphics software is necessary.

| Table 28 |
|-----------------|-----------------|-----------------|
| Relationship Between Developing a Basic Understanding of the Use of Computer Graphics and Importance of Computer Graphics |
| Number of Cases | Correlation Coefficient | Probability Level |
| 67              | .6364             | .0001           |

Further, question 25 "Students will develop an understanding of the basic features of word processing" and question 30 "Rate the importance of word
processing" was analyzed using the Pearson Product Moment Correlation Coefficient.

Question 25 had a very strong relationship with question 30 (p < .01) (Appendix F, G, and Table 29). The mean for question 25 was 4.44 and the mean for question 30 was 4.59. This finding indicates that those who felt it necessary that students have developed an understanding of the basic features of word processing tend to feel word processing software is extremely necessary.

<table>
<thead>
<tr>
<th>Number of Cases</th>
<th>Correlation Coefficient</th>
<th>Probability Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>67</td>
<td>.7122</td>
<td>.0001</td>
</tr>
</tbody>
</table>

Finally, question 26 "Students will develop an understanding of the basic use and application of an electronic spreadsheet" and question 31 "Rate the importance of electronic spreadsheet" was analyzed using the Pearson Product Moment Correlation Coefficient.
Question 26 had a very strong relationship with question 31 ($p < .01$) (Appendix F, G, and Table 30). The mean for question 26 was 4.63 and the mean for question 31 was 4.77. This finding indicates that those who felt an understanding of the basic use and application of an electronic spreadsheet to be extremely important tend to feel electronic spreadsheet software is extremely important.

Table 30

<table>
<thead>
<tr>
<th>Number of Cases</th>
<th>Correlation Coefficient</th>
<th>Probability Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>67</td>
<td>.7045</td>
<td>.0001</td>
</tr>
</tbody>
</table>

The mean of computer applications were ranked to determine the computer application with the highest mean. The results show that word processing (question 30), electronic spreadsheets (question 31), and database management (question 32) are the computer applications with the highest means. Desktop publishing (question 36) ranked the lowest with both
the university and business respondents (Appendix F, G, and Table 31).
<table>
<thead>
<tr>
<th>Business Respondents</th>
<th>Mean</th>
<th>University Respondents</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>32. Database management</td>
<td>3.923</td>
<td>32. Database management</td>
<td>4.341</td>
</tr>
<tr>
<td>34. Electronic mail</td>
<td>3.808</td>
<td>34. Electronic mail</td>
<td>3.634</td>
</tr>
<tr>
<td>35. Electronic bulletin boards</td>
<td>3.115</td>
<td>35. Electronic bulletin boards</td>
<td>3.244</td>
</tr>
<tr>
<td>36. Desktop publishing</td>
<td>3.038</td>
<td>36. Desktop publishing</td>
<td>3.146</td>
</tr>
</tbody>
</table>
Profile of respondents

Means and standard deviations were calculated using the mean of the computer skills questions (questions 11 through 29) for each of the different types of education respondent. The mean for the chairpersons was the lowest of all the groups (3.603) and had the highest standard deviation (.4466) (Table 32).

<table>
<thead>
<tr>
<th>Position</th>
<th>Number of Respondents</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provost/V.P.</td>
<td>2</td>
<td>3.631</td>
<td>.2978</td>
</tr>
<tr>
<td>Dean</td>
<td>14</td>
<td>3.778</td>
<td>.3577</td>
</tr>
<tr>
<td>Chairperson</td>
<td>15</td>
<td>3.603</td>
<td>.4466</td>
</tr>
<tr>
<td>Faculty</td>
<td>8</td>
<td>3.741</td>
<td>.3523</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>4.158</td>
<td>---</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>3.631</td>
<td>---</td>
</tr>
</tbody>
</table>
Means and standard deviations were calculated using the mean of the computer skills questions (questions 11 through 29) for each of the different types of business respondent. One respondent listed "Service" as the business type and one listed "Financial" as the type of business. With only one respondent in the category, standard deviation could not be calculated. Twenty two respondents responded that manufacturing was the type of business. The manufacturing respondents had a mean of 3.732 on the mean of the skills questions and a standard deviation of .3202 (Table 33).

<table>
<thead>
<tr>
<th>Type of Business</th>
<th>Number of Respondents</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail</td>
<td>2</td>
<td>3.289</td>
<td>.6327</td>
</tr>
<tr>
<td>Service</td>
<td>1</td>
<td>4.105</td>
<td>----</td>
</tr>
<tr>
<td>Financial</td>
<td>1</td>
<td>4.000</td>
<td>----</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>22</td>
<td>3.732</td>
<td>.3202</td>
</tr>
</tbody>
</table>

Table 33
Comparison of the Mean of the Skills Questions for Each Type of Business Respondent
Means and standard deviations were calculated using the mean of the computer applications questions (questions 30 through 36) for each of the different types of education respondent. The mean for the Provost / Vice President was the lowest of all the groups (3.357) and had the highest standard deviation (.7071). The number of respondents for this category was two (Table 34).

<table>
<thead>
<tr>
<th>Position</th>
<th>Number of Respondents</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provost/ V.P.</td>
<td>2</td>
<td>3.357</td>
<td>.7071</td>
</tr>
<tr>
<td>Dean</td>
<td>14</td>
<td>4.112</td>
<td>.3501</td>
</tr>
<tr>
<td>Chairperson</td>
<td>15</td>
<td>3.800</td>
<td>.5785</td>
</tr>
<tr>
<td>Faculty</td>
<td>8</td>
<td>3.982</td>
<td>.5423</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>4.286</td>
<td>---</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>4.143</td>
<td>---</td>
</tr>
</tbody>
</table>

Means and standard deviations were calculated using the mean of the computer applications questions (questions 30 through 36) for each of the different types of business respondent. One respondent listed "Service" as the business type and one listed
"Financial" as the type of business. With only one respondent in the category, standard deviation could not be calculated. Twenty two respondents responded that manufacturing was the type of business. The manufacturing respondents had a mean of 3.780 on the mean of the computer applications questions and a standard deviation of .4962 (Table 35).

<table>
<thead>
<tr>
<th>Position</th>
<th>Number of Respondents</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail</td>
<td>2</td>
<td>4.142</td>
<td>.4041</td>
</tr>
<tr>
<td>Service</td>
<td>1</td>
<td>4.000</td>
<td>----</td>
</tr>
<tr>
<td>Financial</td>
<td>1</td>
<td>3.429</td>
<td>----</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>22</td>
<td>3.780</td>
<td>.4962</td>
</tr>
</tbody>
</table>

Table 35
Comparison of the Mean of the Applications Questions for Each Type of Business Respondent
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This chapter is organized into four parts: research methodology, summary, conclusions, and recommendations. The research methodology section provides a description of the population, the research instrument, data collection procedures, and data analysis. A review of the findings are described in the summary section. Conclusions based upon the data are presented, in the conclusions section, and the recommendations section provides recommendations for further research.

Research Methodology

Data for this study were collected using mailed questionnaires. There were two target populations for this study. The first was all businesses in Ohio, and the second was all the colleges and universities in Ohio. The accessible populations were all the Fortune
500 businesses that are headquartered in Ohio, and all four-year colleges and universities in Ohio listed in the *Paterson's Guide*, that have a business administration department and an enrollment over 750 students. A census of the accessible populations was used, therefore, sampling was not appropriate.

The university population consisted of 49, four-year colleges in the state of Ohio. Forty nine surveys were sent out, and a total of 41 (83.6%) were returned.

The business population consisted of 37 Fortune 500 companies headquartered in the state of Ohio. Thirty seven surveys were sent out, and a total of 30 (81%) were returned. Of the 30 surveys returned, 26 were determined to be usable.

The data were presented in the form of frequency distributions, means, standard deviations, confidence intervals, t-test, and Pearson Product Moment Correlations.

**Summary**

The purpose of this study was to examine the relationship between the computer skills needed by business administration graduates as perceived by personnel directors of Fortune 500 businesses headquartered in Ohio, and computer skills currently
being taught in Ohio university and college business administration departments. This study investigated five research questions.

Research Question 1: Is there a difference between the computer skills being taught at Ohio colleges and universities and the computer skills needed by Ohio businesses?

Summary: This question was analyzed using means, standard deviations, standard error, confidence intervals, and t-test. The computer skills questions (questions 11 through 29) were analyzed individually and as a group, the group mean was used to answer the research question.

A t-test comparing the type of respondent (business or university) found responses from universities and business to be significantly different, at the 0.05 level for question 15, "students will develop an understanding of the changes which are occurring in business as a result of technology," question 18, "students will develop an introductory background in programming concepts," question 20, "students will develop an understanding of the program cycle: Design, Coding, Testing, and Documentation," and question 26, "students will develop an understanding of
the basic use and application of an electronic spreadsheet."

However, to answer the first research question the mean of the computer skills (questions 11 through 29) was calculated and analyzed by type of respondent. The t value for this comparison was -.1995 with a probability of .8425. Therefore, although significant differences may occur on individual items, it can be concluded when looking at the overall mean of the computer skills there is no significant difference between the computer skills being taught at Ohio colleges and universities and computer skill needed by business.

**Research Question 2:** According to personnel directors, what computer skills should business graduates possess for entry-level employment?

**Summary:** This question was analyzed by ranking questions 11 through 29 by mean, standard deviation, standard error and confidence intervals.

The most important skill for a business graduate to possess for entry-level employment is question number 22, "based on a variety of circumstances, students will be able to make decisions necessary to solve problems." The mean for this question was 4.385 with 95% confidence that the actual mean falls between
4.06 and 4.71. Other important skills (questions 26 and 25) include an understanding of electronic spreadsheets, and word processors.

The lowest mean was for question 12 "Students will develop an understanding of the history, development, and trends of computers". Other skills with low means were questions 21 and 11 which include understanding how to use conditional and unconditional operations and the ability to manipulate a desktop publishing package.

**Research Question 3:** What is the relationship between the computer skills taught at large colleges and universities and computer skills taught at small colleges and universities?

**Summary:** This question was analyzed using means, and Pearson Product Moment Correlation Coefficients. The skills questions (questions 11 through 29) were analyzed with the second demographic question, size of the university. Analysis was also computed by comparing the mean of the skills questions (questions 11 through 29) with the size of the university.

The results of the Pearson Product Moment Correlation Coefficient indicated that there were no significant correlations between computer skills taught
at large colleges and universities and computer skills taught at small colleges and universities.

The researcher analyzed the Pearson Product Moment Correlation Coefficient between the mean of the computer skills questions, and the size of the university, and found no significant correlation.

**Research Question 4:** Is there a difference between the type of hardware currently used by companies and the type being used by colleges and universities?

**Summary:** This question was analyzed with a t-test comparing companies and colleges and universities with the type of computers currently used.

Results of the t-test indicate that there is a significant difference at the .05 significance level, between the type of hardware used by companies, and the type of hardware used by universities.

The frequency distribution showed the companies use all three types while colleges are more likely to just have microcomputers.

**Research Question 5:** Is there a difference between the amount of importance placed on application software by companies and the amount of importance placed on application software by colleges and universities?
Summary: This question was analyzed using frequency distributions, means, standard deviations, confidence intervals, and t-test. The computer applications questions (questions 30 through 36) were analyzed individually and as a group, the group mean was used to answer the research question.

A t-test comparing the type of respondent (business or university) found question 32 "importance of database management" to be significantly different at the .05 level (Appendix F, G and Table 25).

A positive t value indicates that the education mean was significantly higher than the business mean.

The mean of computer applications questions (questions 30 through 36) was also calculated and analyzed by type of respondent. The t value for this comparison was .5779 with a probability of .5653. Therefore, when looking at the mean of the computer applications questions, it can be concluded that there is no difference between the importance placed on different computer applications by businesses and education.

Conclusions

Based on the findings of the study a number of conclusions are warranted.
1) The computer skills deemed necessary by business matched those computer skills colleges and universities felt to be necessary for business administration graduates. The three most important computer applications as perceived by both businesses and the colleges and universities were: word processing; electronic spreadsheets; and database management. These findings agree with the findings of: Shelly, Cashman, and Waggoner (1990); Athey, Day, and Zmud (1987); Baker, Perry, and White (1991); Redmann, Seaward, and Griffin (1990); Oswalt and Arn (1989); and Brooks (1986).

2) Personnel directors in this study felt that the most important skill for a business graduate to possess for entry-level employment was, to be able to make decisions necessary to solve problems. Other important skills include an understanding of electronic spreadsheets, and word processors. The least important skills were in the area of programming, and the understanding of history, development, and trends of computers.

These findings are in contrast to research by Leuhrmann (1984), and Hunter (1984). Leuhrmann (1984)
lists the ability to read and write computer programs as one of the important characteristics of a computer literate person, while Hunter (1984,) includes a knowledge of: programming; the social impact of computers; and the history of computers as knowledge a person needs to have about computers in order function well in his/her job or personal life.

This inconsistency in research findings may be due to the evolution of necessary computer skills. The findings of both Leuhrmann and Hunter are eight years old.

3) The computer skills being taught at large colleges in this study and the computer skills taught at small colleges in this study appeared to be the same as no significant relationship was found between the computer skills taught at large and small universities. Therefore, the size of the educational institution does not appear to be related the computer skills being taught.

4) The type of computers used at universities and the type of computers used in businesses in this study are different. The results show that businesses are more likely to use all three types of computers
(mainframe, minicomputer, and microcomputer), while, colleges and universities are more likely to use just microcomputers.

5) No significant difference existed between the importance of computer skills and the type of respondent (college or university in the study and business in the study).

Desktop publishing was found to be the least important computer application, and word processing and electronic spreadsheets to be the most important computer applications.

These findings for research questions one and five agree with the findings of: Shelly, Cashman, and Waggoner (1990); Athey, Day, and Zmud (1987); Baker, Perry, and White (1991); Redmann, Seaward, and Griffin (1990); Oswalt and Arn (1989); and Brooks (1986).

6) The findings indicate that those who felt it necessary that students develop skills in using applications software tend to feel computer application software is necessary.
Recommendations

This section offers recommendations for current practices and future research.

1. This study found that word processing, electronic spreadsheets, and database management are important computer applications according to personnel directors. The researcher recommends the colleges and universities in Ohio continue to teach word processing, electronic spreadsheets, and database management to business administration graduates.

2. Changes in the needs of business require change in type of preparation necessary for business administration graduates. The researcher recommends that business and colleges and universities in Ohio maintain a working relationship to keep up with the changing technology.

3. One way for colleges and businesses to maintain a working relationship is through the use of periodic surveys. The researcher recommends that surveys be conducted to provide information regarding the types of computer skills currently being used, and to identify entry-level requirements.
4. This study examined the relationship between the computer skills needed by business administration graduates as perceived by personnel directors of Fortune 500 businesses headquartered in Ohio, and computer skills currently being taught in Ohio university and college business administration departments. The researcher recommends that replications of this study be conducted to establish the reliability of the findings.

5. The researcher recommends that similar studies be conducted directed at other geographical areas and at the national level.

6. The researcher recommends that similar studies be conducted directed at two-year colleges to determine if two-year colleges are meeting the needs of business.

7. The researcher recommends that a study be conducted to determine if a relationship exists between the computer skills taught at two-year colleges and computer skills taught at four-year colleges and universities.
REFERENCES


Clark, C. B. (1986) A study to determine the guidelines used by business and industry to identify the computer literacy of business graduates employed in entry-level positions that do not require a degree in computer science. Doctoral Dissertation, Indiana University.


Fortune 500 (April 1990).


APPENDIX A
LETTER TO COLLEGES AND UNIVERSITIES
Dear *first name*:

Computer skills are being taught to business administration graduates at most central Ohio colleges and universities. In an attempt to determine the extent to which colleges and universities are meeting the needs of business, we are conducting a survey.

Would you, or an appropriate member of your staff please take about 15 minutes to complete this questionnaire? Your help is important because of the small number of individuals that are part of this survey.

Your response will be completely confidential. The questionnaire you receive will have an identification number that will be used only to help track the number of people who do not respond. Your name will never be used in any way.

Please complete the questionnaire by December 10, 1991, and return it in the enclosed self-addressed, stamped envelope. If you have any questions, please call (419) 289-5241.

Thank you for your time and help on this matter.

Sincerely,

J. David Lifer  
Assistant Professor  
Ashland University

Anthony A. Olinzock  
Associate Professor  
The Ohio State University
APPENDIX B
LETTER TO BUSINESSES
*first name* *last name*
*company*
*address 1*
*address 2*
*city*, *state*  *zip*

Dear *mr/ms.* *last name*:

Computer skills are being taught to business administration graduates at most central Ohio colleges and universities. In an attempt to determine the extent to which colleges and universities are meeting the needs of business, we are conducting a survey.

Would you, or an appropriate member of your staff please take about 15 minutes to complete this questionnaire? Your help is important because of the small number of individuals that are part of this survey.

Your response will be completely confidential. The questionnaire you receive will have an identification number that will be used only to help track the number of people who do not respond. Your name will never be used in any way.

Please complete the questionnaire by December 10, 1991, and return it in the enclosed self-addressed, stamped envelope. If you have any questions, please call (419) 289-5241.

Thank you for your time and help on this matter.

Sincerely,

J. David Lifer  Anthony A. Olinzock
Assistant Professor  Associate Professor
Ashland University  The Ohio State University
APPENDIX C
FOLLOW-UP LETTER TO BUSINESSES
*first name* *last name*
*company*
*address 1*
*address 2*
*city*, *state*  *zip*

Dear *mr/ms.* *last name*:

About two weeks ago we sent you a questionnaire dealing with computer skills of business administration graduates. As of today’s date, we have not received your response.

If you have already completed and returned the questionnaire, thank you and disregard this mailing.

We realize you are a very busy person, but would you, or an appropriate member of your staff, please take about 15 minutes to complete the questionnaire? In case you have misplaced the survey, we are enclosing another copy. If you have any questions, please call (419) 289-5241.

Your help in completing the questionnaire is very much appreciated.

Sincerely,

J. David Lifer  
Assistant Professor  
Ashland University

Anthony A. Olinzock  
Associate Professor  
The Ohio State University
APPENDIX D
FOLLOW-UP LETTER TO COLLEGES AND UNIVERSITIES
December 12, 1991

*business dean*
business dean
*college*
college
*address1*
address1
*address2*
address2
*city*, *state*, *zip*
city, state, zip

Dear *first name*:

About two weeks ago we sent you a questionnaire dealing with computer skills of business administration graduates. As of today’s date, we have not received your response.

If you have already completed and returned the questionnaire, thank you and disregard this mailing.

We realize you are a very busy person, but would you, or an appropriate member of your staff, please take about 15 minutes to complete the questionnaire? In case you have misplaced the survey, we are enclosing another copy. If you have any questions, please call (419) 289-5241.

Your help in completing the questionnaire is very much appreciated.

Sincerely,

J. David Lifer
Assistant Professor
Ashland University

Anthony A. Olinzock
Associate Professor
The Ohio State University
APPENDIX E

LETTER OF PERMISSION TO USE INSTRUMENT
August 26, 1991

Mr. David Lifer
3403 Catter Road
Butler, Ohio 44822

Dear David,

In reference to our telephone conversation, I am pleased that someone has had an opportunity to read my dissertation, and I give my permission for you to use survey forms A & B for your dissertation.

Upon completion of your dissertation I would be interested in reading your abstract. Good luck! If there is anything I can do to assist you please feel free to contact me.

Sincerely,

Dr. George Carter
Assistant Principal
Administrative Affairs

GC/jbm
QUESTIONNAIRE FOR THE BUSINESS SETTING

The purpose of this questionnaire is to seek your assistance in providing information which will be useful in determining the desired computer skills of business administration graduates of Ohio college and universities.

Read and complete the questionnaire within the next few days. Please answer each question, based on your opinion.

SECTION 1: GENERAL INFORMATION

Directions

Please indicate your answer by circling the appropriate letter.

1. The type of business is
   A. RETAIL
   B. SERVICE
   C. FINANCIAL
   D. MANUFACTURING
   E. OTHER: SPECIFY

2. Which department has the greatest demand for computer applications?
   A. ACCOUNTING
   B. MANAGEMENT
   C. HUMAN RESOURCES
   D. FINANCE
   E. OTHER: SPECIFY

3. Approximately what percent of your employees use the computer as part of their job?
   A. NONE
   B. BETWEEN 1 - 25 PERCENT
   C. BETWEEN 26 - 50 PERCENT
   D. BETWEEN 51 - 75 PERCENT
   E. BETWEEN 76 - 100 PERCENT

4. What affect has the computer had in the operating procedure of business activities?
   A. NONE
   B. VERY LITTLE
   C. SOME EFFECT
   D. A GREAT DEAL
5. What types of computers are you currently using?
   A. Microcomputer
   B. Minicomputer
   C. Mainframe

6. Which of the following competencies do you feel is the most important to employees?
   Rate them 1, 2, or 3, with 3 being the top and 1 the lowest.
   ___ Computer literacy
   ___ Computer programming
   ___ Computer applications

7. Is additional computer training needed for business graduates employed in entry-level positions? If yes, answer questions 8 and 9. If no go directly to question 10.
   A. Yes
   B. No

8. How much additional computer training is generally required for entry-level employees with business degrees?
   A. Less than one week
   B. Over one week and less than one month
   C. Over one month and less than three months
   D. Over three months and less than six months
   E. Over six months — Please specify months:________

9. What is the estimated cost to provide the additional training?
   __________________________

10. What is the one computer area that you feel business graduates are the weakest?
    __________________________
Section 2: SPECIFIC INFORMATION

Directions
Please state how IMPORTANT each competency listed below is to the successful performance of a business administration graduate by circling the appropriate number.

RATING SCALE:
1) Extremely Unnecessary; 2) Unnecessary; 3) Undecided; 4) Necessary; 5) Extremely Necessary.

<table>
<thead>
<tr>
<th>Extremely Unnecessary</th>
<th>Extremely Necessary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circle your answer</td>
<td></td>
</tr>
</tbody>
</table>

11. Students will develop the ability to manipulate a desktop publishing package. 1 2 3 4 5

12. Students will develop an understanding of the history, development, and trends of computers 1 2 3 4 5

13. Students will develop an understanding of the basic components and operations of a computer system. 1 2 3 4 5

14. Students will demonstrate appropriate proficiency in keyboarding skills. 1 2 3 4 5

15. Students will develop an understanding of the changes which are occurring in business as a result of technology. 1 2 3 4 5

16. Students will demonstrate the proper procedure in operating a computer by loading, interacting, and executing various software packages. 1 2 3 4 5

17. Students will demonstrate proficiency in evaluating a piece of software. 1 2 3 4 5
18. Students will develop an introductory background in programming concepts.
1 2 3 4 5

19. Students will develop an understanding of the role of the computer as an aid in solving problems.
1 2 3 4 5

20. Students will develop an understanding of the program cycle: Design, Coding, Testing, and Documentation.
1 2 3 4 5

21. Students will develop an understanding of how to use conditional and unconditional operations.
1 2 3 4 5

22. Based on a variety of circumstances, students will be able to make decisions necessary to solve a problem.
1 2 3 4 5

23. Students will develop a basic understanding of the use of computer graphics.
1 2 3 4 5

24. Students will demonstrate proficiency in using DOS programs to format, copy, and view file directories.
1 2 3 4 5

25. Students will develop an understanding of the basic features of word processing.
1 2 3 4 5

26. Students will develop an understanding of the basic use and application of an electronic spreadsheet.
1 2 3 4 5
### Rating Scale:

1) Extremely Unnecessary; 2) Unnecessary; 3) Undecided; 4) Necessary; 5) Extremely Necessary.

<table>
<thead>
<tr>
<th>Extremely Unnecessary</th>
<th>Extremely Necessary</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Circle your answer)</td>
<td></td>
</tr>
</tbody>
</table>

27. Students will be able to design a database for manipulating data about people, places, things, or occurrences.

28. Students will be able to identify task-oriented components of an integrated software package.

29. Students will be able to identify and generate pie, line, bar, and circle graphs.

---

**GIVEN THE USE OF COMPUTER TECHNOLOGY, HOW WOULD YOU RATE THE IMPORTANCE OF THE FOLLOWING AREAS?**

30. Word processing

31. Electronic Spreadsheet

32. Database Management

33. Computer Graphics

34. Electronic Mail

35. Electronic Bulletin Boards

36. Desktop Publishing
J7. What additional computer instruction do you believe should be provided for college students graduating with business degrees?

THANK YOU VERY MUCH!!
APPENDIX G
SURVEY INSTRUMENT - EDUCATION
QUESTIONNAIRE FOR THE EDUCATIONAL SETTING

The purpose of this questionnaire is to seek your assistance in providing information which will be useful in determining what computer skills are being required for business administration graduates at Ohio college and universities.

Read and complete the questionnaire within the next few days. Please answer each question, based on opinion.

SECTION 1: GENERAL INFORMATION

Directions

Please indicate your answer by circling the appropriate letter.

1. Title of person completing the instrument
   A. PROVOST/V.P. ACADEMIC AFFAIRS
   B. DEAN
   C. CHAIRPERSON
   D. FACULTY
   E. OTHER: SPECIFY

2. The approximate school enrollment
   A. FEWER THAN 1000
   B. BETWEEN 1000 - 4999
   C. BETWEEN 5000 - 9999
   D. MORE THAN 9999

3. Which area has the greatest demand for computer instruction been shown?
   A. ACCOUNTING
   B. MANAGEMENT
   C. HUMAN RESOURCES
   D. FINANCE
   E. OTHER: SPECIFY

4. Approximately what percent of the students experience a computer course before graduating?
   A. NONE
   B. BETWEEN 1 - 25 PERCENT
   C. BETWEEN 26 - 50 PERCENT
   D. BETWEEN 51 - 75 PERCENT
   E. BETWEEN 76 - 100 PERCENT
5. What effect has the computer had in the instructional process of students in your department?
   A. NONE
   B. VERY LITTLE
   C. SOME EFFECT
   D. A GREAT DEAL

6. What types of computers are you currently using?
   A. MICROCOMPUTER
   B. MINICOMPUTER
   C. MAINFRAME

7. Which of the following competencies do you feel is the most important to students?
   Rate them 1, 2, or 3, with 3 being the top and 1 the lowest.
   ____ COMPUTER LITERACY
   ____ COMPUTER PROGRAMMING
   ____ COMPUTER APPLICATIONS

8. Do you feel businesses will provide additional computer training for business graduates after being employed in entry-level positions? If yes, answer question 9. If no go directly to question 10.
   A. YES
   B. NO

9. How much additional computer training is needed?
   A. LESS THAN ONE WEEK
   B. OVER ONE WEEK AND LESS THAN ONE MONTH
   C. OVER ONE MONTH AND LESS THAN THREE MONTHS
   D. OVER THREE MONTHS AND LESS THAN SIX MONTHS
   E. OVER SIX MONTHS -- PLEASE SPECIFY MONTHS:

10. What is the one computer area that you feel business graduates are the weakest?
   ____________________________________
**Section 2: SPECIFIC INFORMATION**

**Directions**
Please state how IMPORTANT each competency listed below is to the successful performance of a business administration graduate by circling the appropriate number.

<table>
<thead>
<tr>
<th>RATING SCALE:</th>
<th>Extremely Unnecessary; 2) Unnecessary; 3) Undecided; 4) Necessary; 5) Extremely Necessary.</th>
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<tr>
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<th>Extremely Necessary</th>
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<td>(Circle your answer)</td>
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</table>

11. Students will develop the ability to manipulate a desktop publishing package.  
   1  2  3  4  5

12. Students will develop an understanding of the history, development, and trends of computers.  
   1  2  3  4  5

13. Students will develop an understanding of the basic components and operations of a computer system.  
   1  2  3  4  5

14. Students will demonstrate appropriate proficiency in keyboarding skills.  
   1  2  3  4  5

15. Students will develop an understanding of the changes which are occurring in business as a result of technology.  
   1  2  3  4  5

16. Students will demonstrate the proper procedure in operating a computer by loading, interacting, and executing various software packages.  
   1  2  3  4  5

17. Students will demonstrate proficiency in evaluating a piece of software.  
   1  2  3  4  5
RATING SCALE:
1) Extremely Unnecessary; 2) Unnecessary; 3) Undecided; 4) Necessary; 5) Extremely Necessary.

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18. Students will develop an introductory background in programming concepts.

19. Students will develop an understanding of the role of the computer as an aid in solving problems.

20. Students will develop an understanding of the program cycle: Design, Coding, Testing, and Documentation.

21. Students will develop an understanding of how to use conditional and unconditional operations.

22. Based on a variety of circumstances, students will be able to make decisions necessary to solve a problem.

23. Students will develop a basic understanding of the use of computer graphics.

24. Students will demonstrate proficiency in using DOS programs to format, copy, and view file directories.

25. Students will develop an understanding of the basic features of word processing.

26. Students will develop an understanding of the basic use and application of an electronic spreadsheet.
RATING SCALE:
1) Extremely Unnecessary; 2) Unnecessary; 3) Undecided; 4) Necessary;
5) Extremely Necessary.

27. Students will be able to design a database for manipulating data about people, places, things, or occurrences.

28. Students will be able to identify task-oriented components of an integrated software package.

29. Students will be able to identify and generate pie, line, bar, and circle graphs.

(Circle your answer)

<table>
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<tbody>
<tr>
<td>1 2 3 4 5</td>
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</table>

GIVEN THE USE OF COMPUTER TECHNOLOGY, HOW WOULD YOU RATE THE IMPORTANCE OF THE FOLLOWING AREAS?

30. Word processing

31. Electronic Spreadsheet

32. Database Management

33. Computer Graphics

34. Electronic Mail

35. Electronic Bulletin Boards

36. Desktop Publishing

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37. What additional computer instruction do you believe should be provided for college students graduating with business degrees?

THANK YOU VERY MUCH!!
APPENDIX H
OHIO COLLEGES AND UNIVERSITIES
College or University

Ashland University
Baldwin-Wallace College
Bowling Green State University
Capital University
Case Western Reserve University
Cedarville College
Central State University
Cleveland State University
College of Mount St. Joseph
Defiance College
DeVry Institute of Technology
Dyke College
Franciscan University of Steubenville
Franklin University
Heidelberg College
Hiram College
John Carroll University
Kent State University
Lake Erie College
Lourdes College
Malone College
Marietta College
Miami University
Mount Union College
Mount Vernon Nazarene College
College or University (continued)

Muskingum College
Ohio Dominican College
Ohio Northern University
Ohio University
Ohio Wesleyan University
Otterbein College
Shawnee State University
The Ohio State University
The University of Akron
Tiffin University
Union Institute
University of Rio Grande
University of Cincinnati
University of Toledo
University of Dayton
University of Findlay
Urbana University
Ursuline College
Walsh College
Wilmington College
Wittenberg University
Wright State University
Xavier University
Youngstown State University
APPENDIX I

PANEL OF EXPERTS
Panel of Experts:

Dr. Doug Anderson  
Professor of Management  
Ashland University

Mr. Mike Drushal  
Assistant Professor of Computer Information Systems  
Ashland University

Dr. Kathleen Flanagan  
Associate Professor of Education  
Ashland University

Mr. John Parker  
Computer/Network Manager  
Gorman-Rupp Company

Dr. Rafiq Rasul  
Associate Professor of Statistics  
Ashland University
APPENDIX J
FORTUNE 500 COMPANIES IN OHIO
**Fortune 500 Companies**

A. Schulman  
American Greetings Corporation  
B F Goodrich  
Chemed Corporation  
Chiquita Brands Co N America  
Cincinnati Milacron, Inc.  
Cooper Tire and Rubber Co.  
DANA Corporation  
Eagle-Pincher  
Eaton Corporation  
Ferro Corporation  
Figgie International  
Gencorp Inc.  
Goodyear Tire and Rubber Company  
Lincoln Electric Company  
Lubrizol Corporation  
M. A. Hanna Company  
Mead Corporation  
Nacco Industries  
NCR Corporation  
Owens-Corning Fiberglass  
Owens-Illinois  
Parker Hannifin Corporation  
Penn Central Corporation
Philips Industries Inc.
Procter and Gamble Company
Reliance Electric Company
Reynolds & Reynolds Company
Rubbermaid Inc.
Sealy Holdings
Sherwin-Williams
Standard Register Company
The Standard Products Company
Timkin Company
Trinova Corporation
TRW Inc.
Worthington Industries, Inc.
APPENDIX K
BASIC PROGRAM TO PRINT HISTOGRAMS
10 KEY OFF
20 DIM TOT(2,50,70)
30 OPEN "C:\BASDAT.ASC" FOR INPUT AS #1
40 FOR I = 1 TO 41
50 FOR QUEST = 1 TO 39
60 INPUT #1, OBS
70 TOT(1,QUEST,OBS)=TOT(1,QUEST,OBS)+1
80 NEXT QUEST
90 NEXT I
100 FOR I = 1 TO 26
110 FOR QUEST = 1 TO 39
120 INPUT #1, OBS
130 TOT(2,QUEST,OBS)=TOT(2,QUEST,OBS)+1
140 NEXT QUEST
150 NEXT I
170 FOR QUEST = 1 TO 39
180 FOR RESPON = 1 TO 5
190 CLS
200 LPRINT "EDUCATION TOTALS"
210 LPRINT "QUESTION " QUEST;"NUMER ";RESPON;
220 TOT(1,QUEST,RESPON)
230 NEXT RESPON
240 NEXT QUEST
250 FOR RESPON = 1 TO 5
260 LPRINT "BUSINESS TOTALS"
270 LPRINT "QUESTION " QUEST;"NUMBER ";RESPON;
280 TOT(2,QUEST,RESPON)
290 NEXT RESPON
300 NEXT QUEST
310 GOSUB 850 :REM PLOT X-Y AXIS SUBROUTINE
320 LOCATE 3,40:PRINT"QUESTION # ":QUEST-3
330 ROW= 23: COL=10
340 FOR RESPON = 1 TO 5
350 ROW=24 : COL=COL+3
360 LOCATE ROW,COL : PRINT RESPON:
370 ROW = 22
380 LOCATE RESPON+4,40
390 PRINT"Education Response
390 #"RESPON;TOT(1,QUEST,RESPON)
400 FOR J = 1 TO TOT(1,QUEST,RESPON)
410 LOCATE ROW,COL : PRINT CHR$(177)
420 ROW=ROW-1
430 IF ROW <=1 THEN ROW =1
440 NEXT J
450 ROW = 22 : COL=COL+1
460 LOCATE RESPON+10,40
470 PRINT"Business Response
470 #";RESPON;TOT(2,QUEST,RESPON)
480 FOR J = 1 TO TOT(2,QUEST,RESPON)
BASIC PROGRAM (continued)

490    LOCATE ROW,COL : PRINT CHR$(219)
500    ROW=ROW-1
510    IF ROW <=1 THEN ROW =1
520    NEXT J
530    NEXT RESPON
540    A$=INKEY$:IF A$=""THEN 540
550    NEXT QUEST
560    WIDTH 80
570    PRINT "PRINTING %"
580    FOR QUEST = 1 TO 39
590    GOSUB 1010 :REM PLOT X-Y AXIS SUBROUTINE
600    LOCATE 3,40:PRINT"QUESTION # ":QUEST-3
610    ROW= 23: COL=10
620    FOR RESPON = 1 TO 5
630    ROW=24 : COL=COL+3
640    LOCATE ROW,COL : PRINT RESPON;
650    ROW = 22
660    LOCATE RESPON+4,40
670    PRINT"Education Response
#
"
680    FOR J = 1 TO (INT(TOT(1,QUEST,RESPON)/41*100))/4
690    LOCATE ROW,COL : PRINT CHR$(177)
700    ROW=ROW-1
710    IF ROW <=1 THEN ROW =1
720    NEXT J
730    ROW = 22 : COL=COL+1
740    LOCATE RESPON+10,40
750    PRINT"Business Response
#
"
760    FOR J = 1 TO (INT(TOT(2,QUEST,RESPON)/26*100))/4
770    LOCATE ROW,COL : PRINT CHR$(219)
780    ROW=ROW-1
790    IF ROW <=1 THEN ROW =1
800    NEXT J
810    NEXT RESPON
820    A$=INKEY$:IF A$=""THEN 820
830    NEXT QUEST
840    END
850    REM PLOT X-Y AXIS
860    CLS
870    FOR B= 1 TO 23
880    LOCATE B,8 :PRINT CHR$(219)
890    NEXT B
900    SCAL = 0
910    FOR B = 23 TO 1 STEP -5
920    LOCATE B,3: PRINT SCAL
930    SCAL = SCAL + 5
940    NEXT B
950    FOR B= 5 TO 40
BASIC PROGRAM (continued)

960  LOCATE 23,B:PRINT CHR$(219);
970  NEXT B
980  LOCATE 24, 40 : PRINT "EDUCATION "CHR$(177);
990  LOCATE 24, 55 : PRINT "BUSINESS "CHR$(219);
1000 RETURN
1010  REM PLOT X-Y AXIS
1020  CLS
1030  FOR B = 1 TO 23
1040     LOCATE B,8 :PRINT CHR$(219)
1050  NEXT B
1055  LOCATE 1,2:PRINT"%"
1060  SCAL = 0
1070  FOR B = 23 TO 1 STEP -4
1080     LOCATE B,3: PRINT SCAL
1090     SCAL = SCAL + 16
1100  NEXT B
1110  FOR B = 8 TO 40
1120     LOCATE 23,B:PRINT CHR$(219);
1130  NEXT B
1140  LOCATE 24, 40 : PRINT "EDUCATION "CHR$(177);
1150  LOCATE 24, 55 : PRINT "BUSINESS "CHR$(219);
1160  RETURN