contributing to a wide range and variety of interests which Shearon (2) says promotes excellence in education and a scholarly ethos in the institution. By participating in the development of this ethos, students in agriculture and liberal arts have established an avenue along which others may pursue agriculture and history with vigor and vitality.

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Horticulture Businessmen and Teachers' Opinions Relative to Peripheral Supporting Courses

Mike Iacomini and Fred W. Reneau

The field of ornamental horticulture is a broad collection of professions, including positions in nursery management, landscape horticulture, floriculture and turfgrass management. The value of plant production and allied industrial goods and serviecs has increased. The estimated value of wholesale nursery stocks in the 1970's was near $400 million (Davidson, 1981). The assessed value of all greenhouse produced plants increased to nearly one billion dollars in 1977 (Nelson, 1978). A few years later, the retail market value of all nursery products was valued at 3.4 billion dollars (Lederer, 1981).

At the same time, the task of producing an educated person for the employment market was enormous if one considered the changes affecting society in the last decades. Society changed through the granting of civil rights, the debate concerning equal rights for women and other minorities, and the expansion and preservation of personal freedom. Technology and scientific advances, moreover, in knowledge grew exponentially in the last twenty years. All these changes plus progress in information management and dissemination, space age building materials, gains in fuel efficiency and other technological advances began to transform ornamental horticulture into a progressive field of study.

Also at the same time, agricultural departments hampered by a reduction in budgets, staff size and decreasing enrollments meant the ornamental horticulture education field was hard pressed to furnish a complete and up-to-date education for students (Goecher, 1982; Martin, 1984). Furthermore, the average high school student was ill prepared to provide more than manual labor, without the ability to solve problems quickly and accurately. Thus the college system was left with the task of providing the industry with trained graduates during a time when it was trying to meet multiple needs combined with cutbacks.

As all these changes occurred in technology and society, the business arrangement in ornamental horticulture also changed (Drake, 1982). The changes in business demanded graduates who possess the ability to work with people, manage with proven business expertise, and incorporate proven technology. Accordingly, educators needed to keep up with trends in society, technology and business in order to train professionals for the industry. There was much agreement among educators and industry professionals regarding core course composition in ornamental horticulture. However, there was no such unity of mind regarding the supporting peripheral courses. Goecher (1982) stated that "with strong pressure to incorporate more science, more communication, more technical courses, and more experience activities with the curricula, we must aggressively seek possible efficiencies in structuring curricula and packaging college courses" (p. 21).

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Resulting Research Questions

1) What is the relationship between ratings of the attained level of education and the rating of selected supporting curriculum?
2) What is the relationship between the ratings of need for horticulture teachers and businessmen in regard to peripheral supporting courses?
3) What is the relationship between the ratings of teachers at two-year and four-year schools regarding supporting curriculum?

Population and Sample

The population of this study included ornamental horticulture teachers at the community college and university levels in Illinois and a sample of practicing businessmen in Illinois. The teachers taught at least one ornamental horticulture class per school year. The names of businessmen for the study were obtained from the combined lists of active members of the Illinois State Nurserymen's Association, Illinois Landscape Contractors's Association, Illinois State Florist Association, Illinois Arborist Association, and Illinois Turfgrass Foundation, Inc. A random sample was selected from these groups. A total of 200 out of 1348 businessmen were surveyed.

A population of 75 teachers was obtained by securing the faculty lists from colleges and universities in Illinois that offered courses in ornamental horticulture.

Resulting Instrument

The instrument was designed to determine how the sample felt about qualities of selected courses. A list of courses was identified through a review of literature. The list was reduced to those deemed pertinent by eliminating those which were duplicated.

Background data concerning business specializations and educational achievement were obtained in the first section of the questionnaire. The background data obtained from the teacher questionnaire dealt with the teacher's teaching experience and educational attainment.

A rating of courses was obtained from both the businessmen and teacher questionnaires. The respondents were asked to fill out the survey using the five position rating system. The five point standard required a response but allowed room for indecisiveness and flexibility. The five point standard scale was as follows:

1) Essential — Employee must possess the skills taught in this course for employment.
2) Important — Employee should possess the skills taught in this course for employment.
3) Good to have — Skills taught in this course would be useful for employment.
4) Not needed — Skills taught in this course are not necessary for employment.
5) Do Not Know — Have no opinion regarding course.

The third section allowed the respondent to convey a personal attitude or opinion on a specific question, section, the whole questionnaire, or an area not covered by the survey.

Prior to the mailing of the questionnaire, a panel of experts was assembled to determine that the questionnaire asked the questions clearly and measured what it was supposed to measure.

Data Collection Procedures and Analysis

The questionnaires were distributed and collected by mail. The packet mailed to the ornamental horticulture teachers and businessmen included an introductory letter, a questionnaire and a stamped, self-addressed envelope. Each questionnaire was coded to identify the school or business to which it was mailed.

Frequencies and percentages were formulated. Data were analyzed using mean ranking and the Spearman rank order correlation coefficient. Spearman's coefficient was used to determine the extent of a relationship between the paired data. All results were tested at the .05 level of significance.

Results

The Sample

The questionnaire was mailed to a random sample of ornamental horticulture businessmen and college teachers teaching ornamental horticulture courses in the state of Illinois. Of the 200 questionnaires mailed to the businessmen, 97 (48.5 percent) were returned. One questionnaire was returned as undeliverable. Follow up calls were made to a sample of non-respondents, four additional questionnaires for a total of 101 (50.5 percent) completed questionnaires. Of the 75 questionnaires sent to the teachers, 54 (72 percent) were returned completed (Table 1).

Table 1. Businessmen by Specialization and Teachers Teaching Horticulture

	Distribution		
Specialization/ Program	**Surveyed**	**Returned**	**%**
Specialization			
Greenhouse	50	21	42
Turfgrass	50	24	48
Nursery	50	21	42
Landscaping	50	35	70
Total	200	101	50.5
Teaching Program			
Two-year	53	33	62
Four-year	22	21	95
Total	75	54	72

Seventy-five of the horticulture businessmen had earned an associate, bachelor, or masters degree. Thirty-nine teachers had earned a masters or PhD degree.

Research Question #1:

"What is the relationship between the attained level of education and the rating of selected supporting curriculum?"

The horticulture businessmen and teachers with an associate degree rated four courses "essential." The teachers and businessmen with a bachelor's degree rated six courses "essential." The businessmen and teachers with a master's degree rated nine courses "essential." Teachers with a doctoral degree rated eight courses "essential." Work Experience/Internship was rated as the most essential course by the businessmen and teachers (Table 2).

Table 2. Courses Identified as Essential by Horticulture Businessmen and Teachers*

	Academic Level				
	High School N = 26	Associate Degree N = 21	Bachelor Degree N = 60	Masters Degree N = 29	PhD Degree N = 19
Public Relations	2.92	2.88	2.57*	2.79	3.21*
Work Experience Internship	3.24*	3.85*	3.65*	3.67*	3.16*
Equipment Operation Repair	2.88	2.76	3.32*	3.35*	2.47
Plant Pathology	2.69	3.10*	3.11*	3.27*	3.32*
Entomology	2.71	3.17*	3.13*	3.37*	3.32*
Plant Physiology	2.81	3.00	3.11*	3.27*	3.32*
Mathematics	2.74	3.15*	2.63	3.26*	2.79
Computer Science	1.91	2.47	2.31	3.15*	3.00
Marketing	2.73	2.75	2.50	3.08*	3.00
Personnel Management	3.00	2.70	2.83	3.04*	3.16*
Public Speaking	2.40	2.25	2.57	2.79	3.21
Technical Writing	2.20	2.16	2.30	2.96	3.16*

N = 155 Ornamental Horticulture Teachers (54); Ornamental Horticulture Businessmen (101)
* Means of courses rated as "Essential"

The relationship between the education level and selected courses was high to very high positive (significant at the .05 level). The Spearman rank order correlations ranged from .79 to .95.

Research Question # 2:

"What is the relationship between horticulture teachers and businessmen in regard to peripheral supporting courses?" The businessmen rated one work experience/internship course as "essential." Teachers rated four courses as "essential." These courses were:

work experience/internship, entomology, plant pathology and plant physiology. The relationship between the teachers and businessmen and the ranking of courses was very high positive (Table 3). The Spearman rank order correlation was .97 (significant at the .05 level).

Table 3. Mean Score and Rank of Supporting Courses by Businessmen and Teachers

	Businessmen N = 101		Teachers N = 54	
Courses	Mean	Rank	Mean	Rank
Work Experience/Internship	3.33	1	3.39	1
Entomology	2.99	2	3.36	2
Plant Pathology	2.96	3	3.29	3
Plant Physiology	2.95	4	3.05	4
Equipment Operation/Repair	2.83	5	2.89	7
Public Relations	2.79	6	2.81	11
Personnel Management	2.76	7	2.93	6
Mathematics	2.72	8	2.95	5
Marketing	2.56	9	2.84	8.5
Public Speaking	2.47	10	2.84	8.5
Irrigation	2.45	11	2.41	16.5
Finance	2.39	12	2.41	16.5
Economics	2.37	13	2.44	14.5
Accounting	2.36	14	2.68	13
Construction/Surveying	2.33	15	2.44	14.5
Writing, Technical	2.24	16	2.80	12
Computer Science	2.19	17	2.82	10
Business Law	2.18	18	2.26	19
Chemistry	2.13	19	2.31	18
First Aid	1.99	20	2.08	21
Foreign Language	1.84	21	1.84	22
Psychology	1.83	22	2.17	20
Engineering	1.82	23	1.67	26
Geology	1.69	24	1.71	24.5
Physics	1.67	25	1.76	23
Art	1.65	26	1.71	24.5
Philosophy/Ethics	1.63	27	1.65	27
Sociology	1.60	28	1.52	28
Geography	1.55	29	1.42	29.5
History	1.40	30	1.18	32.5
Political Science	1.33	31	1.42	29.5
Anthropology	1.28	32	1.18	32.5
Music	1.20	33	1.24	31

Spearman Rank Order Correlation Coefficient = .97

Research Question #3:

"What was the relationship between the course ranking by teachers at two-year and four-year schools regarding rating of supporting curriculum?"

Teachers from two-year schools rated six courses as "essential." These courses were: work experience/-internship, entomology, plant pathology, plant physiology, equipment operation/repair and mathematics. Teachers from four-year programs rated ten courses as "essential." These courses were: public speaking, technical writing, work experience/internship, plant pathology, entomology, computer science, personnel management, marketing, plant physiology and public relations.

The Spearman rank order correlation was .85, high positive (Hinkle, 1979) and significant (Table 4).

Table 4. Mean Score and Rank of Supporting Courses by Two-Year Program Teachers and Four-Year Program Teachers

	Teachers			
	Two-year		Four-year	
Courses	Mean	Rank	Mean	Rank
Work Experience/Internship	3.46	1	3.29	3.5
Entomology	3.43	2	3.24	5
Plant Pathology	3.29	3	3.29	3.5
Equipment Operation/Repair	3.12	4	2.52	17
Mathematics	3.12	5	2.67	13
Plant Physiology	3.02	6	3.10	8.5
Personnel Management	2.80	7	3.14	6.5
Marketing	2.68	8	3.10	8.5
Public Relations	2.68	9	3.05	10
Accounting	2.57	10	2.68	12
Computer Science	2.53	11	3.14	6.5
Public Speaking	2.49	12	2.38	1
Construction/Surveying	2.48	13	2.38	19
Writing, Technical	2.47	14	3.33	2
Irrigation	2.35	15.5	2.50	18
Economics	2.35	15.5	2.57	14.5
Finance	2.30	17	2.57	14.5
First Aid	2.18	18	1.88	26
Psychology	2.09	19.5	2.29	20
Business Law	2.09	19.5	2.55	16
Chemistry	1.94	21	2.90	11
Foreign Language	1.71	22	2.05	22.5
Philosophy/Ethics	1.68	23	1.60	27
Art	1.58	24	1.90	25
Sociology	1.50	25	1.55	29
Geology	1.48	26	2.05	22.5
Physics	1.45	27	2.25	21
Geography	1.39	28	1.48	30
Engineering	1.38	29	2.00	24
Political Science	1.32	30	1.58	28
History	1.16	31.5	1.21	33
Music	1.16	31.5	1.39	31
Anthropology	1.13	33	1.26	32

Spearman Rank Order Correlation Coefficient = .85

Conclusions

1. In general, horticulture teachers and businessmen support of selected courses was positive. Work experience/internship was the only course considered "essential" for all students enrolled in a horticulture program, regardless of educational level of the teachers and businessmen.
2. Teachers of two-year programs and teachers of four-year programs ranking of supporting courses was very similar.
3. Work experience/internship, plant pathology, entomology and plant physiology are viewed as "essential" by teachers in two-year and four-year programs.
4. No courses are viewed as "not needed" by the horticulture businessmen and teachers.

Recommendations

1. Work experience/internship courses should be required in undergraduate ornamental horticulture curriculums.
2. Further studies are needed to further refine the list of courses and determine the opinions of current students and recent graduates of ornamental horticulture programs.

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Occupational Use of Microcomputers By Former Agriculture Students

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Several authors have written about approaches being implemented in colleges of agriculture to meet the computing needs of students. For example, Foster and Walker (1984) discussed how the University of Nebraska-Lincoln makes sophomores computer literate through a course about computer networks, programming, and commercial software. Other authors have written about microcomputers being integrated into existing courses. Russell (1985) explained that seniors in animal science at the University of Wyoming use microcomputers to make better management decisions. Weber, Young, and Pearson (1985) detailed how an advanced farm management course was revised to incorporate more computer instruction at Washington State University. Hsu and Hsu (1985) discussed how microcomputers are integrated into a landscape architecture course at Washington State University.

These examples indicate that universities are attempting to produce computer literate graduates. However, questions must be posed about whether these efforts provide computing skills students need to become successful professionals. A follow-up study of former students conducted by Reber and Kern (1985) provided such evidence about an approach implemented at the University of Missouri. Reber and Kern found that a new computing course increased both student interest and computing skills. They also found that 42% of the former students used their computing skills on the job. Although 60% planned to own a computer, only 12% already owned one.

Statement of the Problem

A course was implemented in 1981 at Mississippi State University to make agriculture graduates more effective computer users. To assess the effectiveness of that course, the following questions were formulated:

1. What are the characteristics of former students who use or do not use microcomputers in their occupations?
2. What factors discriminate between users and nonusers of microcomputers in their occupations?
3. What barriers inhibit the adoption of microcomputers in the former students' occupations?
4. What types of microcomputer software are used by former students in their occupations?

Population and Sample

All students enrolled in AEE 5203/7203 (Application of Microcomputer Technology to Agricultural and Extension Education) were included in the population. These students enrolled for three hours of undergraduate or graduate credit in the semester length course. The course included 30 contact hours of lecture and 30 hours of laboratory activities using microcomputers. Course content focused on how to use microcomputer hardware and a variety of software. Students used more than 15 agricultural programs distributed by the Mississippi Cooperative Extension Service. Almost 50% of the class time was used teaching BASIC programming the first two years the course was taught. As the course evolved over the years, the amount of BASIC programming decreased to 25% and was replaced by instruction on electronic spreadsheets and word processing. Students were also taught how to access agricultural computer networks such as AGNET and AgriData.

Students representing almost all of the agriculture majors at Misissippi State University enrolled in the course. Most were U.S. citizens; however, for this study all international students were excluded to avoid comparisons across various cultures and nations. With this limitation, the target population of 324 students was stratified by sex and level of credit sought before a random sample of 150 students was selected.

Data Collection

A questionnaire to collect the data was content validated by a panel of faculty who had expertise in both technical agriculture and computer science. Course records provided the grades students earned in the course, the level of credit sought, and their sex.

Three scales developed by Cantrell (1982) and modified by Mitchell (1985) were used to assess potential barriers to former students using computers in their occupations, their attitudes toward computers, and software they used in their occupations. The barriers scale included nine items rated from one (Small Problem) to 10 (Large Problems). Zero indicated a barrier was not a problem. The attitudes scale included 12 items rated from Strongly Disagree (1) to Strongly Agree (8). The software scale included eight common types of software rated from Not Used Extensively (1) to Used Extensively (10). Zero meant a piece of software was not being used. To distinguish between occupational users and non-users, the former

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