instructional work by 89.4 percent of the respondents. Sixty-nine respondents (60.5 percent) used the computer for both instructional and non-instructional applications. The use of computers for instructional purposes by those with agricultural engineering degrees represented 62.0 percent of their group as compared to 78.1 percent for those with non-engineering degrees.

The chi-square analysis indicated that those with engineering degrees used MS-DOS microcomputers more than they did the APPLE, whereas the non-engineers reported a greater use of APPLE microcomputers. Those with appointments in agricultural engineering departments used more MS-DOS microcomputers than APPLE, but APPLE microcomputers were the preference of respondents with agriculture-education appointments.

Commercial software was the primary software source for instructional purposes. Those with non-engineering degrees used more commercial software. Those with engineering degrees wrote more software programs than did the non-engineers.

The respondents using the APPLE microcomputer were larger users of commercial software. Custom-made software was more evident by those using MS-DOS microcomputers. The non-engineers used the commercial software packages on the APPLE microcomputer for instructional purposes. The engineers used more software written by self or peer on the MS-DOS microcomputers. When categorized by age, the APPLE microcomputers were used by the older group and the MS-DOS by those in the younger group.

Conclusions

Microcomputer use for instructional and non-instructional work was greater than the author expected. Seventy-one percent of the respondents used computers for instructional work, and 89.4 percent used computers for non-instructional work. Non-engineers (78.1 percent) used the microcomputer for instructional purpose more than the engineers (62.0 percent). The non-engineers were primarily APPLE users whereas the engineers were users of MS-DOS microcomputers. Respondents with appointments in agricultural engineering departments were the predominate users of MS-DOS microcomputers, and those with agriculture-education appointments were APPLE users.

Commercial software packages were used primarily for the class work. Non-engineers used APPLE software packages whereas the engineers predominantly used custom-made software for MS-DOS microcomputers. Non-engineers may have preferred APPLE microcomputer software due to 1) the availability of educational software programs, 2) the acceptance of the program as an instructional tool and 3) the instructor's desire to use the program as intended by the programmers.

Recommendations

The agricultural mechanics instructors who use microcomputers are to be commended for their leadership. Colleges of agriculture need to be concerned about the instructors (30 percent) not using the microcomputer as an instructional tool. Mechanized agriculture tasks suitable for the microcomputer and the advantages and disadvantages of custom-made or commercial software need to be identified. The suitability of different computers for specific applications needs to be evaluated. To encourage instructors to use the computer more often, it is proposed that colleges of agriculture.

1) Conduct seminars on computer applications for instructional purposes and invite specific groups and/or individuals.
2) Conduct seminars on how to integrate the microcomputer into instructional programs.
3) Purchase computers identified by instructors.
4) Purchase software related to planned use in specific classes.
5) Provide follow-up assistance for instructors who have been supplied with hardware and software.

Professional development for college faculty is a continuing process. For agricultural mechanics professors, it must include mastery of the microcomputer.

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Plant Locator — A Computer Program to Promote Learning Plant Identification

Dick Pohl

Abstract

A computerized plant list has been developed and implemented in landscape design and plant materials courses at Montana State University to facilitate locating plant materials. Students learning ornamental plant identification are typically shown only one or two specimens of a species in the field. The plant locator program provides students with a source for additional nearby locations of these species based on 13 different criteria: genus, specific epithet, cultivar, three common names, family, street location, house number,

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direction from the house, light exposure, age, and landscape use. Once the appropriate information is obtained from the computer, students may go out to field inspect the species in question and study botanical characteristics, growth characteristics, and landscape use. In addition to presenting plant information, the program provides a user friendly interaction with personal computers thereby promoting computer literacy. The data bank may also be used by instructors in planning class field walks to organize better these experiences in specific outdoor locations.

Introduction

The traditional method of teaching ornamental plant identification consists of field plant walks during which students are introduced to many species of woody and herbaceous ornamental plants. Due to the constraints of scheduled lab time, all plant walks must be restricted to excursions on or around the campus, thereby missing some of the more distant locations where better examples of certain species are found. Regularly scheduled labs must often deal with adverse weather conditions which can limit the field experience. Large group labs may not provide adequate time for all students to study the plants fully in field condition without interruption. Group learning may work well for some students but may present difficulty for others (D'Albro, 1983). Students should be provided with choices in learning styles so that several methods of instruction are available to suit each learner (Carrier, 1984). Individualized learning time in the field may be critical for mastery by certain students (Johnson and Johnson, 1970). Computer applications in agriculture should be incorporated into instruction throughout the curriculum (Hegwood and Merrit, 1987). The versatility of computers in instruction allows for dynamic opportunities in individualized learning.

Time and schedule limitations restrict the instructor's ability to show students plant species at more than one location. The value of comparing one specimen against another is not readily available under such study techniques. Limited field instruction may result in the following problems:

a) learning the plant by location rather than characteristics
b) seeing the species at only one age of maturity
c) seeing the species used in only one landscape function
d) seeing the species in just one season, and
e) seeing only a limited part of the range of variability of a species

Procedure

A computer program was written in Microsoft BASIC which allowed students access to an ornamental plant data base which is maintained with Ason-Tate's dBaseII program. The query program used by students in written in "Microsoft BASIC"[1] and was developed by Richard King, computer programmer. Within the data base 244 ornamental plant specimens are currently listed with the following information: genus, specific epithet, cultivar, up to three different common names, family, street location, house number, direction from house, exposure to light and weather, age of plant, and landscape use. Retrieval of information can be at random from any of the above categories. A student could ask for all the entries for a complete family. If the scientific name has been forgotten, the plant may be accessed by its common name. The landscape use category allows access to all the entries which are listed under that specific category such as clipped hedge or groundcover. Once the information is obtained, students may then go outdoors to locate the plant for field study in a new setting. This individualized plant walk may then be scheduled at any time or season to review and verify plant information.

Students in a plant materials class and an advanced landscape design class were introduced to the Computer Plant Locator Program as a part of one lab exercise during the 1985-86 academic year. There was no pressure from the instructors to use the computer plant locator during the quarter of instruction. A survey questionnaire was distributed by mail to all undergraduate students after their course completion. The survey was designed to solicit response on acceptance of the program as a learning tool and methods to improve it. It consisted of questions on the amount of time spent using the program and a series of eleven questions relating to the value of the program for instructional use. Responses were rated on a scale of 1 (strongly disagree) to 4 (strongly agree).

Results

The response from the questionnaire is illustrated in Table 1. A 63% return rate was obtained from the 30 students surveyed. This response rate is particularly strong considering that the survey was mailed during the summer after students had left campus.

Average inquiries numbered 16 per student and each required a duration of 12 minutes. Of these 16 inquiries, an average of 6.3 were field verified.

Numbers in the table represent mean values for the experimental group. The survey results indicate strong acceptance of the program as a valuable learning aid. Additionally, students generally agreed that they felt more comfortable using a computer and that they would continue to use this program after completing the course. Recommended modifications in the program include a quicker random search, a larger data bank, and improved accessibility to personal computers.

Conclusions

This method of individualized learning for plant identification has clear advantages. Motivated students who wish to excel have access to much more in-

[1]Product names are used in this report solely to provide specific information. Mention of product name does not constitute a guarantee of the product by the Montana Agricultural Experiment Statement, nor does it imply an endorsement over comparable products that are not named.

Table 1. Mean scores for responses to the Plant Locator Computer Program Questionnaire (n=30).

	Mean Response*
Value of Program	
This could be a valuable learning aid.	3.58
This is a valuable learning aid.	3.36
I will continue to use the plant locator to study ornamental plants after this class is over.	2.74
This exercise was a waste of time. I will never use it again.	1.73
Computer Usage	
After using this program, I now feel more comfortable using a computer.	2.80
Instruction on the use of the computer program was inadequate.	1.68
Accessibility	
I would use the program a lot more if the computer search was quicker.	3.20
I would use the program a lot more if the computer lab was in Johnson Hall.	3.00
I would use the program a lot more if it were accessible in the evening.	2.77
Data Base	
Location information entered in the data bank is inadequate for field use.	2.20
The data bank of plant information is not appropriate for this class.	2.05

*1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree.

formation than can be presented in the traditional mode of instruction. Slower students can learn at their own pace and on their own time. Additionally, this method of information retrieval builds confidence in computer literacy through direct application.

Instructors may use this program as an aid in planning a specific plant walk. The program is capable of listing the plants along a specific street or helping the instructor determine how a particular species might fit in with a planned field exercise.

Integration of computers into existing curricula is regarded as a positive step in computer literacy (Menhaus et al., 1984). The more frequently students and instructors use computers in daily coursework the better prepared they will be for future computer applications.

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INSTRUCTIONAL MEDIA REVIEWS

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Morphology of the Rice Plant is an interactive microcomputer program which allows students to learn about the different parts of the rice plant and the growth characteristics. The courseware is easy to use. The computer prompts the user to proceed through the lessons.

Hardware Required

The minimum system requirements include:
PC/PC-XT/PC-AT or compatible
256K of memory
Color graphics adaptor
Color monitor
Double - sided disk drive
DOS 2.0 or later version

Objective

The objective of the program is to introduce the user to the different parts of the rice plant and the terms associated with them. It incorporates these instructional strategies:

— self-paced learning
— information chunking
— active participation by learner
— immediate feedback and reinforcement
— text and graphics integration

The program graphically illustrates the various parts of the rice plant in color and identifies the parts and their function. Following each segment, the user is required to answer a series of review questions. A scorecard of the number of right answers is given on the screen at the end.

Procedure

Loading the program is quite simple; with the disk operating system (DOS) in the memory of the computer the file name indicated on the diskette label is typed in and the program automatically loads after pressing the enter key. You are then prompted to type in your name. Your name is regularly used in the information presented or when instructions are given.

A menu approach is used to allow the individual to select the specific topic to study. Thirteen menu items include:

A. General Objectives
B. Description of Asian Rice
C. Germinating Seed
D. Root
E. Calm
F. Primary, Secondary, Tertiary Tillers
G. Leaf
H. Panicle