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Microcomputer Education In Landscape Architecture Design/Build Practice

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Abstract

The landscape architecture program at WSU is incorporating the microcomputer into a third-year construction course which teaches the student business management skills through micro-computer application in a landscape architecture design/build practice. The course is designed to teach popular software packages in the management of a landscape architecture design/build practice thereby training students in computer applications while teaching them business management skills.

The landscape architecture program in the College of Agriculture and Home Economics at Washington State University (WSU), Pullman, is offering students the opportunity to become familiar with computer technology and to learn popular commercial software packages. **Micro-Computer Education in Landscape Architecture Design/Build Practice** also gives the student a full range of learning experiences in the management of a landscape architecture design/build small business.

During the recent economic recession, the multiple-level/management structure of a landscape architecture design/build practice not only survived, but flourished. The landscape architecture design/build practice incorporates under one roof the project functions of design, construction documentation and contracting. This effective combination is a new management scheme. Historically, design and construction documentation combined as the traditional structure of a landscape architecture firm, while contracting was coordinated through sub-contracting out the work to landscape contractors and builders (Weinberg, Hasegawa/Elliot).

In the WSU landscape architecture program there has been an increased demand for training in management aspects of a design/build practice and in computer applications. The faculty has begun to meet this demand through the course **Micro-Computer Education for Landscape Architecture Design/Build Practice.** This course combines the instructional fundamentals for computer literacy while developing applied and creative uses of the micro-computer to the management of a landscape architecture design/build practice.

Lab Facilities

The course utilizes a micro-computer lab facility at Washington State University which was recently established as an adjunt computer lab supported by Resident Instruction in the College of Agriculture and Home Economics. The lab consists of 14 IBM-PC micro-computers with color monitors and Epson FX-80 dot matrix printers. The room is also equipped with a marker board for instruction purposes and an overhead screen which projects the instructor's station monitor for student observation. Additional hardware for the lab which would increase the effectiveness of this course includes a digitizer and a plotter that can be used for computer-aided design.

Teaching Methodologies

The student audience for this course is undergraduate landscape architecture majors in their third year of study. The lab time is one three-hour lab per week for 12 weeks. Each lab covers one lesson which includes a brief lecture on procedure, lesson handouts, and hands-on computer time. During computer time, the instructor gives individual guidance which further aids the student's learning processes. The majority of the lab time is therefore designed to give the students optimum time to practice the course assignment.

The students do not write programs, but use existing programs on the market that allow them to learn professional practice management through the computer which includes business letter writing, material cost and data inventory, plant inventory for design, customer records, cost estimation, bidding and contracting, and design graphics for more advanced computer-aided design.

The programs the lab utilizes are compatible with the IBM-PC. **Wordstar, MailMerge, CalcStar, DataStar, Formgen** and **Regen** are manufactured by MicroPro International Corp. of San Rafael, California. These programs are used for the major portion of the course. **PC Crayon,** manufactured by PCsoftware of San Diego, California, is used at the end of the course to introduce 2-D graphics. **MicroCad,** manufactured by Computer-Aided Design of San Francisco, California, introduces the student to 3-D computer-aided design. The "user friendliness" of the programs

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developed by MicroPro include instructional menus which appear on the monitor. The program menus, in addition to the procedural lecture, lesson handouts, software references, and individual instruction, are the basic teaching tools.

Wordprocessing

The instructional development of this course is designed as a series of steps that increase in complexity. The purpose of starting the course with wordprocessing is to familiarize the students with computer technology and software manipulation with a relatively simple program. The teaching program includes business letter writing, letter duplication and multiple mailings, contract and agreement writing, and construction specification writing. **WordStar** and **MailMerge** are the software packages used in this phase.

MailMerge used in conjunction with **WordStar** allows duplicate letters to be mailed to large numbers of clients for advertising or announcements. The students were able to practice the wordprocessing programs and also learn how to manipulate this important business communication tool.

Chain printing is a function of **MailMerge** which allows the user to collate information from separate files into a printout. This function is especially useful when preparing construction specifications where a job might not require every specification division. Chain printing allows a file to be retrieved separately from the bulk of the data, edited, and printed. The students were able to practice this efficient use of computer technology in the "cut and paste" and editing of construction specifications.

Calculation

The second phase of instruction includes calculation and accounting that aid in plant, irrigation, and construction material lists and cost estimation. The program utilized in this phase was **CalcStar. CalcStar** functions like a spread sheet where materials can be itemized and costs can be estimated. It also allows for the input of tax percentages and other numerical data like overhead and labor costs. The program can multiply, divide, sum a string of factors, recalculate, and perform other mathematical or statistical formulas in a very short time.

The students practiced three different projects with **CalcStar.** The projects included: landscape installation, irrigation installation, and lumber and hardware material list for deck installation. They then had to follow the given formula to develop their own cost estimations. They could change the price, delete the material, and recalculate the whole list for a new estimation. The students learned the value of this computer program by being able to revise a cost estimation very quickly. They also saw the value of this high-tech device in developing efficient bidding techniques for landscape architecture related projects.

Data Inventory and Management

The third phase of the course becomes more complex with the development of form and report generation through a data inventory base. Three programs were used in this phase. These include: **Formgen** to generate forms, **Regen** to generate reports and **DataStar** to manage a data base. Students were allowed to create their own forms to fit their personal needs. However, lesson handouts included a plant inventory/design form and a customer record form.

The first step in this phase is to create a form through **Formgen.** Once the form has been created, a data base can be built through **DataStar.** For example, the plant inventory is a data base of landscape uses and characteristics of plant materials which was demonstrated to the class. **DataStar** allows the user to scan each specific plant and its landscape characteristics and uses without having to go through a series of cryptic programmed questions to obtain a *listing. This* program also allows the user to narrow the quest for a specific plant by allowing certain uses and/or characteristics of a particular species to be called out in a listing of the complete form. **DataStar** is amazing in its ability to scan data, call out specific data, and to input mathematical formulas for different kinds of rating analyses. Customer records, for example, can be updated through inputing new data and recalculated by mathematical formula. This can be done quickly and easily once the form and the formula have been established.

Regen is a program that can generate a specific report from the data base. For example, branching characteristics and/or flowering color and time of bloom can be called out from the inventory data base for a specific report that is focused on those characteristics. For example, FLOWERTM is a report developed during the class that gives a printout of the plants that flower in May. CUSTDUE gives a report on all of those customer balances due that are over $1,000. When one considers the amount of time it normally takes to prepare an analysis report from a large data base, the time saving capabilities of this high-tech tool cannot be understated. The initial difficulty comes in learning the program and developing an effective form that can hold the desired information base. Time efficiency begins thereafter through the ease of a comprehensive data base management system.

Graphic Design Communication

During the last week, 2-D and 3-D graphics were introduced to the students. This was by far the most popular section of the course. The students expressed great enthusiasm and creativity, especially in the utilization of the 2-D graphics program, **PC Crayon.** The students worked easily with **PC Crayon.** Within one lab period, they were producing graphic etchings and vector symbols and manipulating text strings. The addition of the color monitor added brilliant electronic color to the images. The color could be manipulated in green, yellow, blue, and red for line color. The background color could be changed into a wide range of hues which also altered the color of the image into subtle variations.

Applications of this program in computer-aided education include the use of programs such as **PC Crayon** as a tool which enables students to perceive and create graphic images with ease and clarity. The user can make a mistake and correct it without the time-consuming efforts of the traditional method of graphic illustration. Therefore, the student can be bold and run through a range of learning experiences without tightening up with fear of making a time-consuming mistake. This program might also help the student to produce better graphics at the drawing board. The perception of space, line, color, form, and texture can be improved through observation and mental manipulation of the electronic keyboard.

MicroCad was utilized for 3-D graphic design. This program allows images to be created in three dimensions and it can create them in different scales, perspective views, and rotation. Unfortunately, the lab is not yet equipped with a digitizer and plotter which would make the instruction of this important aspect of graphic design much more interesting and accessible to students.

Conclusion

Micro-computer Education in Landscape Architecture Design/Build Practice was well-received by the students. They showed more enthusiasm in learning this subject matter in a technological format than they might otherwise. One word of caution for the future management of a lab of this nature is that the size of the lab should be kept small with no more than ten students to one instructor. Since there are always students who learn more quickly than others, some students inevitably fall behind. A small class gives each student an equitable amount of the instructor's time.

Computer-aided education is quickly becoming a reality. Educators must join together to make the transition into the computer age a smooth one. Incoming students will be much more adept at computer application as the years advance. Therefore, it is equally important that we as educators keep abreast of advancements in computer technology. Landscape architecture curricula will eventually adapt microcomputer technology to their teaching programs. Teaching methodologies which not only expose students to current technologies but also develop necessary project and business management skills through efficient application of the microcomputer prepare students to meet the increasing demands of the workplace in the new electronic age.

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Overcoming Animal Breeding Teaching Problems

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Animal breeding education has some unique problems in comparison to other areas of animal science, such as reproduction and nutrition. Probably the largest is the time factor involved. Genetic progress can be easily characterized as progress made in small amounts per time unit, yet having a large cumulative effect. While the addition of a feed antibiotic may show large, positive results within a few days, a 2-lb. per year increase in adjusted 205-day cattle weights is not as easily seen. A major difference, though, is that the fed antibiotic has done its good; a higher level will not likely improve results. Thus, progress will not continue upwards but can only stay the same or possibly go down if the antibiotic is withdrawn. Genetic progress, however, continues if proper selection procedures are followed. So genetic selection can easily be more economically beneficial. But a semester of class-room work is hardly sufficient time for a noticeable difference to occur, and charts with progress plotted by year or generation generally create little student enthusiasm.

Another problem arises in applying the classroom principles to real-life situations. A standard homework sheet with a listing of lamb tag numbers and the necessary information needed to calculate adjusted 90-day weights teaches the methodology. Lambs can be weighed in an on-farm laboratory setting, but by the time the calculations are completed, the lamb is out of view and little remains but a number. In both problems, the animal itself is removed from the mind. If the students are directed to select the ten top ewe lambs, simple mathematics places the winners. Little thought goes into herd continuity or complementation; the students are not forced to make real-life decisions. Unfortunately, most livestock evaluation courses, where the animals are more closely observed and scrutinized, use groups of four and contain no production data. No ancestors or progeny are viewed.

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