A Comparison of Interactive Videodisc Modules to Conventional Strategy on College Students' Identification Skills and Species Knowledge of Landscape Plants

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Abstract

No studies were identified that examined the effectiveness of the interactive videodisc in teaching plant identification. This study determined the effectiveness of a computerized interactive videodisc module as an alternative to teaching identification skills and species knowledge of woody landscape plants in a laboratory setting. Forty-five students who enrolled in Horticulture 234 were randomly assigned to either a treatment group or a comparison group. Results showed no difference between the effectiveness of the two strategies in teaching identification skills and species knowledge of the selected woody landscape plants. Implications and recommendations are offered for college educators teaching plant identification.

Introduction

Plant identification is a prerequisite to evaluating and rectifying problems associated with plant selection, establishment, growth, maintenance, and maturation so that the desired product or aesthetic value can be achieved. Students in Horticulture 234 were faced with mastering the identification of about 360 species of landscape plants. This challenge required lecture and laboratory instructors to spend large amounts of time providing students with one-on-one or small group instruction involving relatively simple cognitive tasks. Furthermore, the instructors were limited in the amount of time they could devote to activities such as teaching higher-order cognitive tasks, addressing criteria for plant selection in different landscape situations and developing problem-solving activities in these areas.

After an initial effort on the parts of the professors and teaching assistants, plant identification required persistent study and review by students in order to learn the plant material. Students were encouraged by their instructors to re-walk the campus as a review of their laboratory experience in plant identification. However, many students were not adequately reviewing the plant material because of constraints due to employment, study and homework requirements, in-

clement weather, or a lack of interest. Some students expressed, via course evaluations, a desire to have teaching assistants conduct additional review walks. However, the instructors indicated that this was not feasible due to scheduling problems for students and teaching assistants as well as time constraints on the teaching assistants. As an overall result of these factors, many students performed below par in plant identification, and their grades suffered accordingly.

As an auxiliary study aid to live plants, computer modules interfaced with video images were used to enhance the acquisition of plant identification skills and plant species knowledge needed by students in Horticulture 234. Furthermore, the computerized interactive videodisc modules provided students with review materials whenever they were ready to learn, irrespective of weather conditions. This also freed part of the lecture and laboratory time of the instructor for higher cognitive activities.

Clark (1984) reviewed the capabilities of the videodisc as a dialogue device for education and training. Griffiths (1984) found that effective learning is a two-way process involving dialogue between a teacher and a learner. Videodiscs were viewed by Griffiths as being powerful because of their ability to challenge viewers to become actively involved in their own learning. Interactive videodisc also greatly enhance adaptive instruction by providing access to a greater variety of information (Burwell, 1991). A videodisc program becomes "interactive" when it has either a microprocessor, which allows the user to control various features of the videodisc's program (Griffiths, 1984). Interactive videodisc technology may also assist in reducing the time needed to teach a task. Manning, Balson, Ebner, and Brooks (1983) found that instructors using the videodisc-based program were able to teach a three-hour class in two hours. Considerable research has been published regrading the effectiveness of interactive videodisc for instruction (Burwell, 1991). Research has been reported on outcomes such as learning time, improved learning performance, greater content retention, and learner control (Burwell, 1991). However, no studies were identified that examined the effectiveness of interactive videodisc for teaching identification skills and species knowledge of woody landscape plants. This type of visual computer-assisted instruction was also not previously available on the campus for any plant course. The researchers recognized the innovative potential of developing videodisc materials in landscape horticulture and developed the modules that provided problem-solving

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activities simulating practical applications of the lecture portion of the courses. However, information on the effectiveness of the videodisc modules in teaching plant identification was needed.

Purpose and Objectives

The purpose of the study was to determine the effectiveness of a computerized interactive videodisc module as an alternative to teaching identification skills and species knowledge of woody landscape plants in a laboratory setting. Specifically, the objectives of this study were as follows:

1. To compare interactive videodisc with the conventional laboratory in teaching species knowledge of Dogwood and Viburnum plants.
2. To compare interactive videodisc with the conventional laboratory in teaching identification skills of Dogwood and Viburnum plants.
3. To compare interactive videodisc with the conventional laboratory in teaching species knowledge of Oak and Maple plants.
4. To compare interactive videodisc with the conventional laboratory in teaching identification skills of Oak and Maple plants.

Methods

Population and Sample. The population for this study was all undergraduate students who completed the Horticulture 234 class on identification of woody landscape plants during spring of 1992 (N=45). Forty-five students were randomly assigned to either a computerized interactive videodisc module (treatment group) or a conventionally taught laboratory (comparison group).

Experiment. Treatment group students were required to use the interactive videodisc modules as a supplement to the learning experiences obtained from the lecture and laboratory before they were tested over the material covered in the videodisc. Participation was verified by entrance access, log-on time, and interaction. Those students in the comparison group were required to re-walk the campus as a review of their learning experiences from the lecture and laboratory.

Interactive Videodisc Modules. Four computerized interactive videodisc modules about woody landscape plants were developed. These modules covered maples, oaks, viburnums, and dogwoods. Characteristics featured in the videodisc "Woody Landscape Plants of the Temperate United States" were utilized. These features primarily include "macro" identification traits, such as mature bark appearance and overall plant form. "Micro" identification features, such as dormant bud and twig characteristics which were needed but not available, were photographed by the instructors throughout the calender year with the resulting slide images scanned into computer memory. Dichotomous keys, trait comparisons, and species/week-of-study access were created and software programs were developed using a Macintosh IIx computer with

a hard disc and "Course of Action" as the software programs. These programs were pilot-tested during 1991.

Achievement Measurements. Evaluations were based upon total quiz and exam scores as well as scores of individual test questions pertaining to the material covered by the interactive videodiscs. Students' achievement on plant identification skills and species knowledge was measured by field identification of plants around the campus, and paper examinations prepared by instructors. Those tests were validated by a panel of evaluation and content experts.

Data Analysis. The data were analyzed using the IBM SPSS/PC+ (Statistical Package for the Social Science). The specific statistical technique used was a t-test. An alpha level of .05 was established *a priori* for determining significant differences.

Results

Characteristics of Participants

Forty-five students were randomly assigned to a computerized interactive videodisc (treatment group) or the conventional instruction (comparison group). There was no difference between the two groups with regard to their ability to identify the plants or in their knowledge of these plants.

About 31% of the participants were female and 69% male. Of the total number of participants, 22% were sophomore, 40% juniors, 33% seniors and 4% continuing education students About 31% of the students had a GPA of 2.00-2.49, 53% had a GPA of 2.50-2.99, and 15% had a GPA of more than 3.00.

Horticulture 234 was a required subject for 86.7% of the students but was optional for 13.3% of the students. Forty percent of the students enrolled in the class to learn identification skills of woody landscape plants while 53% enrolled to learn species knowledge and usage of plants. Among the students studied, 82% majored in landscape while 18% majored ether in agronomy, animal science, or in both horticulture and agricultural education. About 60% of the students preferred lecture combined with laboratory exercises in learning Horticulture 234. The remaining 40% preferred either lecture, laboratory, independent learning, or tutorial. About 44% of the students planned to spend, on a weekly basis, less than 5 hours studying Horticulture 234, 30% 5-6 hours, and 26.7% more than 6 hours.

Fifty-six percent of the students had no previous experience in horticulture, 22% had taken only one course in horticulture while the remaining 22% had taken at least 2 courses. Students indicated that their past computer experience was "a little" for 24%, "some" for 20%, and "a lot" for 55.6%.

Objective 1

Table 1 showed that there was no significant difference between the treatment and comparison group on the mean scores of the students on both pretest and posttest about species knowledge of Dogwoods and Viburnums. However, there

were significant differences between pretest and posttest scores of the students (treatment and comparison groups) on species knowledge for the Dogwoods and Viburnums. Students who used the computerized interactive videodisc modules had about 2 more points on species knowledge of Dogwood and Viburnum plants than those who were assigned to conventional laboratory instruction.

Objective 2

There was no significant difference between the treatment group and comparison group on the mean scores of students on both pretest and posttest about identification skills of Dogwoods and Viburnums (Table 2). However, significant differences occurred between pretest and posttest scores of the students (both treatment and comparison group) on identification skills on Dogwoods and Viburnums. Students in the treatment group gained about 5 more points on identification skills scores of Dogwood and Viburnum plants than those who were assigned to the control group.

Objective 3

Table 3 showed that there was no significant difference between the treatment and comparison group on the

Table 1 Students' Species Knowledge (SK) of Dogwoods and Viburnums (N=45)

Group	N	SK Pretest		SK Posttest		Difference		t-value	p
		Mean	SD	Mean	SD	Mean	SD		
Treatment	21	26.52	17.88	70.24	18.56	43.72	21.64	9.26	<.001*
Control	24	29.04	20.36	70.84	20.71	41.80	20.35	10.06	<.001*
t-value		.44		.10		.31		.	
p		.660		.919		.761			

* p<.05; Possible score range = 0–100

Table 2 Students' Identification Skills (IS) of Dogwoods and Viburnums (N=45)

Group	N	IS Pretest		IS Posttest		Difference		t-value	p
		Mean	SD	Mean	SD	Mean	SD		
Treatment	21	7.80	13.33	71.70	14.05	65.89	13.55	16.66	<.001*
Control	24	2.92	8.60	62.24	17.55	59.33	16.46	17.66	<.001*
t-value		1.48		1.98		1.45			
p		.147		.054		.155			

* p<.05; Possible score range = 0–100

Table 3 Students' Species Knowledge (SK) of Oaks and Maples (N=45)

Group	N	SK Pretest		SK Posttest		Difference		t-value	p
		Mean	SD	Mean	SD	Mean	SD		
Treatment	24	29.58	20.62	65.98	14.31	36.39	20.20	8.83	<.001*
Control	21	36.19	18.33	72.62	15.62	36.43	18.23	9.16	<.001*
t-value		−1.13		−1.49		−.01			
p		.265		.146		.994			

* p<.05; Possible score range = 0–100

Table 4 Students' Identification Skills (IS) of Oaks and Maples (N=45)

Group	N	IS Pretest		IS Posttest		Difference		t-value	p
		Mean	SD	Mean	SD	Mean	SD		
Treatment	24	14.82	24.50	82.49	11.11	67.67	22.56	14.69	<.001*
Control	21	24.14	30.49	80.51	14.52	58.87	32.56	7.52	<.001*
t-value		1.14		.52		1.06			
p		.262		.608		.293			

* p<.05; Possible score range = 0–100

mean scores of the students on both pretest and posttest about species knowledge of Oaks and Maples. However, significant differences occurred between pretest and posttest scores for both treatment and comparison groups on their species knowledge of Oaks and Maples. Students in both treatment group and comparison groups increased the same amount of scores (about 36 points) on species knowledge of Dogwood and Viburnum plants.

Objective 4

Table 4 showed that there was no significant difference between the treatment and comparison group on the mean scores of the students on both pretest and posttest about identification skills on Oaks and Maples. However, significant dif-

ferences occurred between pretest and posttest scores of the students (treatment and control groups) on identification skills of Oaks and Maples. Students in the treatment group outscored those in the comparison group by about 9 points on the identification of Dogwoods and Viburnums.

Conclusion

There was no difference between the effectiveness of the two strategies in teaching identification skills and species knowledge of the selected woody landscape plants regardless of the family of these plants. However, students who used interactive videodisc modules tended to gain higher scores

on identification skills of plants than those students who were in the comparison group.

Implications and Recommendations

Interactive videodisc can be used effectively in teaching identification skills and species knowledge of plants. Interactive videodisc can help students learn identification and proper usage of landscape plants. Therefore, researchers recommended that interactive videodisc should be used in teaching or learning identification of woody landscape plants. Researchers also recommended that consideration given for possible expansion of the modules includes all plants covered in Horticulture 234 (about 360 species), and encompasses both identification and proper usage of these landscape plants. Research is needed to learn about what factors motivate or discourage a user, the relationship between student characteristics and interactive videodisc modules, the relationship between species knowledge and plant identification skills, and what plant identification skills or concepts, or cognitive processes are best taught using the interactive videodisc media.

References

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INSTRUCTIONAL MEDIA

REVIEWS

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Garden Ornamentals: Examples, Design Considerations and Garden Use

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Garden Ornamentals: Examples, Design Considerations and Garden Use consists of 70 slides and a script. It is intended for use in a college introductory ornamental horticulture/landscape design course and is designed for large group or small group instruction. The instructional objective of the slide set is to acquaint students with the diversity of garden ornaments and how they are best incorporated to enhance the landscape.

Review Summary

Overall. the rating of this slide set was good to excellent by all three reviewers. The slides are an effective tool to capture student interest in the topic. The good and bad examples of ornaments show clearly the difference in using them effectively.

	Excellent	Good	Fair	Poor
Picture Quality	X			
Sound Quality		X		
Editing Content	X			
Currentness	X			
Organization		X		
Accuracy		X		
Vocabulatory	X			
Interest	X			
Technical Quality		X		
Overall (Avg. of Reviewers)		X		

Summary Remarks

Content Panel Member • This slide set and script satisfy the criteria for meeting the intended audience and purpose needs very well. The authors skillfully introduce design principles through an attractive medium that should capture and hold students' attention. This is a fine example of blending theory with application. The commentary accompanying the excellent slides is clear and to the point, complements the visuals, is supportive and edifying, yet non-intrusive. I recommend this presentation be incorporated into the course(s) for which it was designed.

Virginia Book, Professor, University of Nebraska-Lincoln

Content Panel Member • I feel the text and slides would be helpful in a landscape design course. I would have liked to see more examples and more variety of statuary, fountains, arbors, etc.

Murray Brown, Professor Emeritus, Sam Houston State University

Content Panel Member • The slide set of seventy slides and manuscript goes hand in hand. Both are of professional quality and should be incorporated into an introductory level college class on landscape design.

Byron Harrison, Associate Professor, Arabian Horse Times

Availability

The authors of the slide set state the slide set could be available if demand warrants. Contact Constance Lydon and David Frey, Plant & Sciences Dept., University of Delaware, Newark, DE 19717-1301.