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Developing Connections in Landscape Design Theory: A New Use for Knowledge Maps

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Abstract

Students from a variety of majors including horticulture, housing and interior design, business, criminal justice and art comprise the undergraduate Landscape Design Theory class at Oregon State University. This diversity of student majors means there is a wide range of student knowledge about the history of landscape design and creates a unique teaching opportunity. Knowledge maps were incorporated into the class, which capitalized on this diversity and encouraged student participation. Students in small groups worked together utilizing their collective knowledge of history and landscape design to create a knowledge map. The maps they developed encompassed the historical period from around 2000 BC to the early Twentieth Century and illustrated how many of the landscape design elements from those eras were related.

Introduction

Knowledge maps contain key points with links drawn between them which illustrate their relationship to each other or describe a characteristic of that key point (Figure 1). A number of recent studies support the effectiveness of knowledge mapping as a viable teaching-learning strategy (Evans and Dansereau, 1991; Rewey et al., 1991; Wiegmann et al., 1992). Compared to upper division courses, knowledge maps are more beneficial in introductory level college courses where students have a low prior knowledge (Lambiotte and Dansereau, 1992). Easy to develop and adaptable to a variety of subject domains, knowledge maps serve a variety of functions in the teaching-learning process, including their use as lecture aids, handouts, overheads and as a method of orienting students to a new topic. These student-generated maps can then be used to review content and facilitate their understanding of the complexity and parallelism of a particular subject matter (Dansereau and Newbern, 1997).

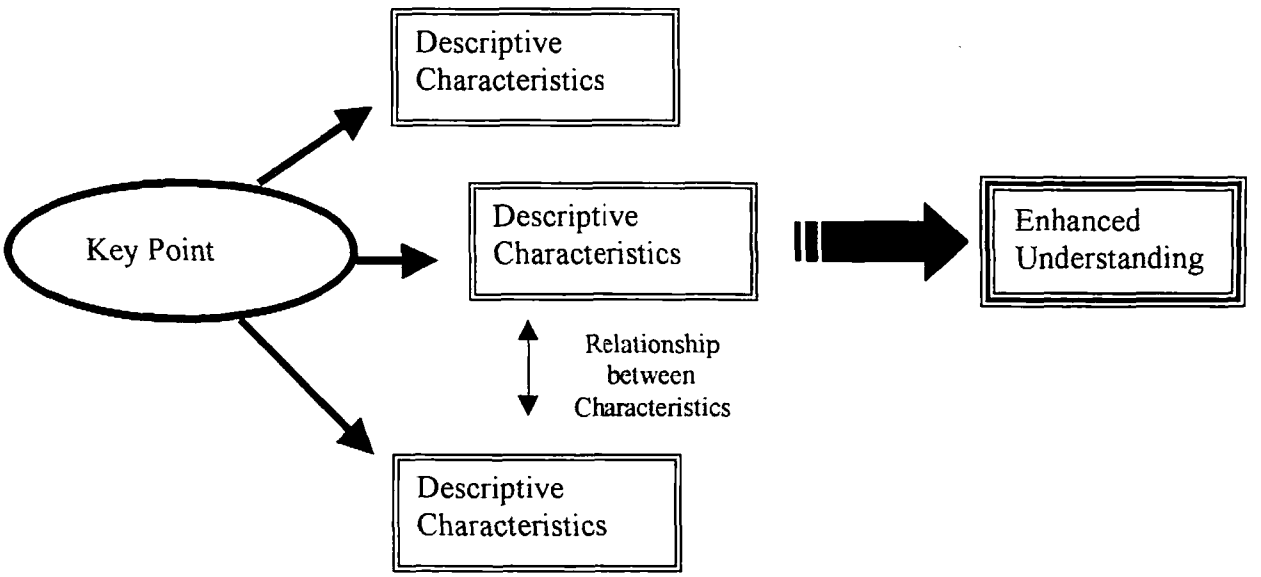

Figure 1. Knowledge map diagram

Methods

Knowledge maps were used in a Sophomore-level Landscape Design Theory class at Oregon State University during fall term 1998. The course objectives were to familiarize students with the history of landscape design and how these historical designs have influenced subsequent trends in landscape architecture. This class is a prerequisite for a majority of horticulture courses. It is often the first time horticulture students, as well as others, learn about landscape design.

Students were divided into groups of three prior to class lectures on landscape design history and were asked to develop a group knowledge map. Each group was given a handout listing major civilizations and historical events that occurred between 2000 BC and the early Twentieth Century. Along with this handout, a list of 20 landscape design elements was distributed to each group. Initially each group developed a timeline of historical events. After the timeline was complete, they linked the different landscape design elements or features with a historical era, thereby creating a map of their understanding of landscape design history.

The student groups evaluated their knowledge map weekly during the four-week unit on landscape design history. During these evaluations they made notes comparing their initial map to that week's lecture material. After the unit was completed, the small groups gathered for a final time and evaluated their initial knowledge map. They discussed their initial map, what associations were correct and how they would do it differently with their enhanced understanding of landscape design history. A member from each group presented the group's map to the class and explained the initial associations the group had made and how those associations would be different after completing the unit.

Each student wrote a one-page reaction paper summarizing his/her understanding of the relationship between history and landscape design elements and features. Students also completed a quiz consisting of short answer, essay and multiple choice questions after completing the reaction papers.

Evaluation and Discussion

When the term was completed students were asked to anonymously evaluate the use of knowledge maps as a teaching-learning tool. In general, students felt they were a useful learning activity that helped them develop a better understanding of the relationship between historical periods and their influence on landscape design. About half the students suggested incorporating them in the Site Analysis and Design Consideration course units. Some students noted that although developing a knowledge map was useful they would have preferred more structure and guidance while developing the initial maps.

Quiz scores offer some insight to student performance. Although not statistically significant, the average quiz score from fall term 1998 was higher than that from fall term 1997, a class in which knowledge maps were not used. The 25-point quizzes were identical each year. In 1998 students averaged 21.5 (n=15) while in 1997 the average was 19.5 (n=28). However, short answer and essay responses from students in 1998 showed a deeper understanding of the material and were often highlighted by concepts specifically illustrated in the knowledge map activity. Answers on the comprehensive final exam were also more in depth and students made substantially more references to the historical influences on recent landscape design trends. Overall, 1998 students were better able to integrate the information from the landscape design history unit into the rest of the course.

Summary

Although none of the students had prior experience with knowledge maps they enjoyed the activity and a majority felt it aided their understanding of course material. It allowed students from different disciplines to share their knowledge of history and landscape design with their peers in the context of developing a knowledge map. Each successive time student groups met there was a noticeable increase in group interaction and communication. Students that normally may not have interacted during the course of the term were actively involved in discussion about landscape design history as well as tangential topics.

Class discussions and student answers on exams suggested the knowledge map activity gave students a more comprehensive understanding of landscape design history and how material throughout the course was related. Additionally, by reviewing the initial maps with students I had a better sense of the class's familiarity with history and landscape design and was able to alter the lecture format to meet the students' needs. These positive results have compelled me to incorporate three additional knowledge map activities into the 1999 Landscape Design Theory course.

This teaching strategy can readily be adapted to a number of other horticulture topics. Knowledge maps are inherently flexible and can easily be incorporated into existing instructional practices. They can supplement current approaches to course delivery and provide a change of pace or shift in perspective for both the instructor and students.

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Perceptions of Agriculture by School Students and Teachers[1]

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Abstract

The purpose of this study was to assess the perceptions and concerns of school students and teachers about animal agriculture. Survey data were collected from 1,358 respondents (6-8th and 11-12th grade students and their teachers) regarding agriculture. To accomplish this goal, three objectives were defined: 1) to gauge student and teacher perceptions of the effects of animal agriculture on society and the environment; 2) to rank their concerns about animal agriculture; and 3) to identify the primary sources of agricultural information for younger students. The results indicated that respondents were generally positive about the benefits of animal agriculture to society and to the environment. Food safety issues were ranked as the greatest concern of all three groups and the younger students (grades 6-8) indicated their primary sources of information were family members, school, and television.

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Introduction

"Agriscience" relates chemical, physical, and biological principles to the production of food and fiber. The application of advances in science and agriculture has allowed the US to produce enough food for its population as well as to participate in global food markets. These remarkable achievements have been accomplished while utilizing only a fraction (2%) of the US workforce in production agriculture (National Research Council. 1988).

Maintaining agricultural production at this level without the degradation of natural resources (air, soil, water) should be a topic of utmost importance for educators, consumer groups, and agribusiness. This goal can be achieved only through continued training of agriculturists and scientists, beginning at the middle and secondary school levels. Current enrollment of US high school students in agriculture-related classes is only 4.5% (Terry et al., 1992). In 1988, the National Research Council's Committee on Agricultural Education concluded that the agricultural education curriculum in secondary schools had "failed to keep up with modern agriculture." To compound this situation, studies indicated that large numbers of American students avoid taking basic science courses, the necessary foundation for studying agriculture, at the secondary school and higher education levels (Wirth, 1992). Integrating science and agriculture courses may help overcome this obstacle. Students enrolled in science-based courses using agriculture and natural resource applications have performed equally well or better than students enrolled in science units using traditional methods (Roegge and Russel, 1990; Connors and Elliot, 1995).