

Concept Mapping: A Tool for Improving Teaching, Learning, and Assessment in Landscape Architecture Design Studios

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ABSTRACT

Concept mapping is an educational tool with the capability of transforming teaching, learning, and assessment in design studios. A concept map is a graphic representation or diagram of knowledge that documents how effectively a learner organizes, represents, and understands a concept. Concept maps can be used by faculty members to assess their teaching efficacy and by students to assess their learning comprehension. Concept maps are particularly appropriate for design studios where project-based learning is common and students and faculty are familiar with creating and analyzing graphic representations.

Studio teachers typically assess their students' progress by critiquing drawings, models, and other graphic representations. However, this type of assessment corresponds to what students choose to show in their work and not the full range of what they've learned over the duration of the studio project. This means that teachers often measure improvements in performance and not necessarily changes in cognition. When combined with typical studio assessments, concept maps provide teachers with another layer of evaluative data that they can use to see what their students have and haven't learned. In addition, concept mapping allows a student's misunderstandings to emerge, indicating the need for an instructional intervention or a reevaluation of teaching methods. This paper uses emergent findings from an ongoing study to support the usefulness of concept maps as an alternative assessment method in landscape architecture design studios.

1. INTRODUCTION

In contemporary landscape architecture design studios, there is a degree of difference between teaching and a teacher's observations of what is being learned. Schön (1985) says that it is difficult for studio instructors to assess what a student has learned from the experience of a studio. The predominant use of current assessment methods including critiques, desk reviews, pin-ups, juries, and discussions exacerbate this problem. A wave of literature during the late 1980's and early 1990's has criticized these existing methods for being unfair, time consuming, passive, tense, confusing, and failing to sufficiently measure learning outcomes (Anthony 1991; Frederickson 1991; Dinham 1989). These studies suggest that design faculty regularly use existing assessment methods as an instructional approach, resulting in a lack of structured assessment and evaluation of student learning in studios. Existing methods of assessment are useful for providing instruction, but they are not the only forms of feedback or assessment available to teachers. Concept mapping, an alternative form of assessment, helps teachers assess student learning while providing additional instructional feedback and documentation of educational outcomes.

2. SIGNIFICANCE AND PURPOSE

The purpose of this investigation is to examine the usefulness of concept mapping as an assessment tool in landscape architecture design studio settings. The aim of the study is to assist in the development of alternative assessment techniques and a body of theory applicable to landscape architecture and other related disciplines that emphasize design studios in their curriculums. Landscape architecture faculty and administrators should consider using concept maps in addition to their existing forms of assessment (e.g. desk critiques, pin-ups, juries, discussion) for four reasons including:

- 1) Concept maps assess different types of student knowledge in design studios that current assessment techniques do not. Cognitive psychologists have delineated knowledge into three discrete types that include: a) declarative knowledge that refers to “knowing that” or knowledge of facts, b) procedural knowledge that refers to “knowing how” or knowledge of processes, c) strategic knowledge that refers to combining declarative and procedural knowledge types to form complex plans (Anderson 2000). Current assessment techniques tend to focus on assessing procedural and strategic knowledge but concept maps also incorporate declarative knowledge.
- 2) Social learning theory suggests that there is a difference between learning for comprehension and learning for performance and that students don’t always demonstrate all that they have learned in a given performance (Bandura 1977). This means, that critiques don’t always measure what a student has learned from a project but instead what the student wants the professor to see – emphasizing looking good rather than comprehensive learning.
- 3) Concept maps document and provide evidence of learning. These documents can be saved and referenced by students, teachers, administrators, and outside agencies such as accrediting boards.
- 4) Concept maps assess prior knowledge (i.e. the knowledge a student has prior to instruction), outcome knowledge (i.e. the knowledge a student has attained as a result of instruction), cognitive growth (i.e. measure of difference between prior knowledge and outcome knowledge), and effectiveness of teaching and learning (i.e. the degree to which a student learned what the teacher wanted the student to learn), while critiques tend to only measure project performance outcomes.

3. LITERATURE REVIEW

This study expands on two key areas of literature and research including: 1) concept maps and 2) social learning theory.

3.1 Concept Maps

As defined by Joseph Novak (1991), “concept maps are tools for organizing and representing knowledge”. They are diagrammatic and hierarchical in their construction. A concept map begins with a central concept or a particular chosen domain of knowledge. This central concept, represented by one or two words, is usually enclosed within a circle or box of some type and typically placed at the top or center of one’s map. What follows is the placement of related concepts below or around the central concept. Cross-links are used to connect concepts and to make propositions, which show interrelationship between concepts (Figure 1).

Ausubel (1978) suggests that the construction of knowledge happens uniquely depending on the individual and that the success of constructing new knowledge is dependent on linkage to preexisting knowledge. Furthermore, the act of making these links will lead to the establishment of meaningful, long-term knowledge, while the act of retrieving this knowledge leads to improved critical thinking (Daley, Shaw, Balistrieri, Glasenapp, and Piacentine 1999). Therefore, the

4. METHODOLOGY²

As part of an ongoing study, participating design studio teachers collect two forms of concept maps, the first a pre-test before instruction and the second a post-test after instruction. The data collection instrument is a two-sided 11x17 sheet of paper. One side of the sheet is blank and used by students to create their concept maps. The other side of the sheet contains a brief description of concept mapping with 2 examples of non-related concept maps and a set of instructions. No time limit is given for completing the concept maps.

As students complete their concept maps, the instructor collects and analyzes them. The method of analysis varies depending on the purpose of the particular map. For pre-test concept maps, design teachers analyze each individual's map to determine what a student currently knows and what gaps exist in their understanding of a particular concept. The teacher then compares the analysis of each student's map with those of the other students in the studio and with their own understanding of the concept; this holistic assessment helps the teacher decide where to begin instruction. For post-test concept maps, design teachers again begin with analyzing each individual's map, but this time they're assessing the overall progression of the student's conceptual understanding from pre-test to post-test, essentially measuring cognitive growth. In addition, teachers compare the post-test map with their own *key map* representing the expected learning outcomes in order to assess the effectiveness of their teaching.

The following example (Figure 2) represents a typical concept map created by a student. In this case, the concept was the country of "Panama" – a broad concept that corresponded with a summer studio involving lectures in the United States and a 10-day field study abroad. Each student in the course had very little prior knowledge about Panama before the studio and thus their pre-test concept maps were very similar to the one shown in Figure 2. However, those students that were more engaged in the studio, such as the student in the example, developed a fuller concept of Panama and thus created a fuller post-test concept map. The studio teacher assessed each student's cognitive growth based upon increases in number, relevance, and sophistication of new words, propositions, descriptions, cross-links, and other significant features.

² Additional examples of concept maps, including the teacher's concept map key, are not included in this discussion paper; the details of these maps are best viewed at a larger size not appropriate for the length of this paper.

6. RECOMMENDATIONS FOR FUTURE STUDIES

1. Provide students and teachers instruction about how to create, analyze, and improve their concept maps.
2. Conduct interviews with teachers and students to validate the concept maps and to see what actions that they take regarding the information provided by concept mapping.
3. Study the effects of empowering students to make concept maps voluntarily as a means of enhancing their studying and academic achievement.
4. Correlate concept maps with student grades and other achievement measures to check the validity of concept maps as a measure of achievement and tool for grading.
5. Examine the use of concept maps in group situations as means to assessing group thinking and productivity.
6. Study the concept maps of experts, such as well-known designers, to see how they think and how their concepts relate to those of students.

7. CONCLUSIONS

This study shows the usefulness of concept mapping as an alternative assessment technique in landscape architecture design studio settings and contributes to the development of an increasingly needed body of theory related to assessment and evaluation in environmental design disciplines. Faculty and administrators should consider reevaluating their program's current assessment techniques to include concept mapping in order to shed light upon the effectiveness of their teaching and learning ventures.

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Architectural Research as On-Going Group Collaboration

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ABSTRACT

Clarifying the frameworks for the conduct of architectural research can liberate educators and practitioners alike. This paper accepts the premise that modes of research are themselves forms of social communication and that knowledge emerges as a social construct. The publication of work and its presentation in a social setting reinforces the fact that it is only by agreement within the peer group that the new theories are tested, new understandings evaluated, and knowledge legitimized.

Two modes of research are now widely accepted. Mode I research, regarded as the Royal Mode of research, involves the formalized framing of a hypothesis and its testing for proof; Mode II, labeled by some as the Nomad Mode, is transient and highly dependent on context—it is trans-disciplinary, non-hierarchical, and involves many actors. Of the two, Mode II research functions as the research model of significant fit for the architectural community—it obviates competitive peer pressure and instead leverages the role of peers as participants in on-going group collaboration.

1. INTRODUCTION

1.1 Academic Disjunction

Typically, architectural schools have survived in their academic settings by positioning themselves as “professional schools”, highlighting the importance of active practice and community outreach by the faculty as forms of research and as activities integral to their studio teaching. Nonetheless, the schools continue to face a disjunction within their respective academic communities because of the traditional emphasis on the scientific method as “the” research model—one that has never provided a broad enough operational fit.

Moreover, as a further complication to the research expectation, architecture schools are also very different from the other “professional schools” found in the university setting. They do not fit the medical school model of a teaching/practice hospital in which research is conducted in a laboratory setting or within the clinical context of the day-to-day patient service; they do not fit the law school model in which new knowledge derives externally—from the judicial actions codified in case law; and they do not fit the engineering school model in which research is pursued primarily as a ‘fundamental’ hard science.

1.2 Research Modes