

UNDERSTANDING HOW STUDENTS APPROACH DESIGN: A QUALITATIVE INQUIRY

KLEIN, CHARLES H.

Texas Tech University, Charles.klein@ttu.edu

1 ABSTRACT

It may be difficult for some design professors to realize that not all students approach design in the same manner that they had, perhaps for decades. The students may favor other, perfectly valid approaches and it would be helpful for the professor to understand how and why students favor one approach over another.

Three primary research questions guided this inquiry; 1) How do students describe how they approach design? 2) What approaches do they prefer and why? 3) How can faculty help them to become more comfortable and confident designers?

Since design is a complex and multifaceted task a qualitative research methodology was used which allowed for the exploration of the research questions from multiple directions. This research followed the phenomenological paradigm that “describes the meaning of the lived experiences for several individuals about a concept or the phenomenon.” (Cresswell 1998, 51). Kevin Lynch’s seven approaches to design (Lynch 1971) were used as a theoretical foundation. Interviews were recorded and later transcribed. A stylized coding form was developed to guide the qualitative inquiry. Member checks were also used to validate the findings.

Results indicated that students tend to use several approaches and that they varied with the circumstances. The research also discovered that students who tended to favor a single approach were often frustrated and confused. Consequently, it is important for professors to understand that students will often use multiple, perfectly valid approaches when solving a design problem.

1.1 Keywords

Design, Qualitative, Interviews, Studio

2 INTRODUCTION

“Does that usually work” I ask? He’s a third year student in a master planning design studio and he is sitting on his stool, staring at his drawing. “What” he responds? “If you stare at it long enough, does anything magically appear?” I ask again. It is my sarcastic wit; an attempt to keep the studio atmosphere fun and light hearted, as well as some good natured teasing to prod the student into action; any action rather than staring.

That was years ago and I’ve long since realized that my sarcasm was not always appreciated; so I’ve tried to keep it check and use it sparingly. More importantly, I now understand why a student stares at his drawing rather than using the same techniques I had always found useful, or any number of others that are available. Not only is he still learning how to approach a design, but contemplation can be a legitimate means to solving a design problem. As good as I am as a teacher, I can’t read his mind.

As I was starting my teaching career, I found it curious that students wanted to base their design on something like the university’s logo or the state symbol. This is often called a representational approach (Motloch, 2001) where by the design is supposed to represent something else, but in a different media, place or size. Some years later I attended a conference where Penn State landscape architecture professor Elisa Pennypacker (2007), presented research she and a colleague had done on how students learn to design. She explained that when they researched how professionals approached design and found that the professionals tend to draw from a store house of experiences; either previous projects of their own or projects they were familiar with. They used the analogy of a tool box and choosing from it the appropriate implement for different situations. Using the tool box analogy is what Lynch (1971) would call employing a case study approach. It was then that I realized that the students who used the university logo were simply drawing from their mostly empty tool box that had very few experiences available to them.

In all, Lynch (1971) describes seven specific approaches to design as well as several techniques. They remain timeless and tend to encompass those approaches and techniques described by other authors and researchers using different terminology. Consequently, Lynch (1971) served as a theoretical or organizational basis for this study.

Ever since I came to the teaching profession with more than 20 years in the professional consulting world I have been interested in understanding how students learn to design and how we teach them. I have also come to realize that well-developed design abilities is one of the most important factors affecting their future employment, entry level income, and positioning for success in a professional design firm. Qualitative research methodology is ideally suited to making sense of complex situations with multiple variables, such as the design process. It is also particularly suited to answering questions such as “what” and “why” by gathering a wealth of information that provides more in depth and insightful data rather than responses to a specific hypothesis (Lindlor and Taylor 2002) (Cresswell 1998) (Gall, Gall and Borg 2007).

Qualitative research is also known as constructivist research, and suggests that individuals construct knowledge within in a cultural context. Consequently, qualitative research typically takes place in the natural setting of the phenomenon under study. It relies on a large volume of data that can provide “thick descriptions” of experiences and perceptions as opposed to numerical or quantifiable data. The volume of the data collected helps overcome situations where a significant sample size is not available. The researcher becomes the data collection instrument and can often be a participant, to some extent, in the phenomenon under study. (Creswell, 1998; Gall, Gall, & Borg, 2007; Giles & Eyler, 1994). Reporting qualitative research studies do not always follow the traditional, scientific format and in fact can vary considerably within the field. (Cresswell, 1998). For example, while some may find the first person narrative distracting, it is often used in qualitative research and emphasizes the nature of this form if inquiry where the researcher is also a participant (Denzin & Lincoln, 2005) (Glesne, 2011).

In addition, this study sought to better understand how, as a professor of landscape architecture, I can help students to become more comfortable, capable and creative designers. It was a phenomenological study conducted in the landscape architecture studio at a large Southwestern university using participant observation and interviews over the course of one semester. Transcriptions of the interviews served as the primary data set and were analyzed using qualitative methodology to identify recurring themes as well as significant unique or isolated insights.

3 RESEARCH QUESTIONS

The three primary research questions that guided this inquiry were:

1. How do students in the landscape architecture curriculum describe how they learn to design?
2. What approaches to design do they prefer and why?
3. How can we, as faculty, help them to become more comfortable and confident as designers of the landscape?

As stated earlier, it is important to understand that when using the term “design” I am referring to the point at which a student is preparing to develop the physical form of the proposed site improvements or changes. A second clarification is that there are two processes taking place at the point where design commences; ideation and implementation. Ideation refers to developing design schemes and concepts whereas implementation involves the process of manipulating those schemes to work in the context of their current project. Finally, it is important to emphasize the distinction between an approach and a technique. A design approach is the theoretical foundation upon which the student chooses to begin solving the problem at hand. A technique involves the actual physical or mechanical means by which the student either ideates or implements the design approach.

4 LITERATURE REVIEW

Design in any profession is a process that in order to be proficient, requires “whole brain thinking” that includes the ability to observe, visualize, generate ideas, conceptualize principles and analyze alternatives (Maraviglia & Kvashny, 2005, p. 73). It requires the mental powers of the left brain and the right brain, the two primary physical aspects of the brain where researchers believe specific functions take place (Maraviglia & Kvashny, 2005). The ability to be both creative and analytical requires critical thinking skills that are the ultimate educational goals and the focus of much research (Halpern, 1998).

As a design profession, landscape architecture began just in the U.S. just before the end of the 19th century. Frederick Law Olmsted, considered the Father of Landscape Architecture recognized that as designers of the land we have the ability to address the quality of life in our cities and rural landscapes through the thoughtful design of our parks, towns and college campuses.

Throughout the 20th century, the profession has embraced environmental, ecological and social foundations for design with the expressed goal of creating a better, more livable built environment. As the profession evolved, so did the theoretical basis for design processes and the educational programs that taught them (Motloch, 2001). Scholars recognized that teaching designers to address the needs of the public required effective means of teaching the design process in order to better prepare professionals for their role in society.

For landscape architecture students, many publications focus on the design process that includes, as phases: an inventory of existing site conditions; analysis of their implications; program development; a statement of goals and objectives; and case study research of similar design problems and solutions. The process continues with the synthesis of the physical form of a design solution using techniques such as: ideal functional diagrams; site-specific functional diagrams; concept plans and other methods of design synthesis (Rutledge, 1971). Most reference materials also offer techniques for implementation of the design process. For example techniques for generating ideas such as brainstorming and questioning techniques are a popular and important aspect of design synthesis (Maraviglia & Kvashny, 2005).

It is important to understand that this study was primarily interested in the point at which, in the design process, design solutions begin to be synthesized and applied to a specific site. It can happen at almost any point in the design process but most often occurs soon after information about the site and the proposed users has been collected and analyzed and the designer starts to apply a physical form to the site plan. Consequently, for the purposes of this study, the term “design” will refer to the synthesis of a solution and not necessarily the process. Additionally, there is a distinction between a design approach and a design technique. An approach is a method upon which the designer bases his analytical and creative thinking about potential design solutions. Techniques are those exercises or tools that are used to implement the approach. For example, a designer may base his design for a residential subdivision on patterns that are traditional to the context of his project. That is the approach. To implement that approach, he or she may use techniques such as probing, which involves a series of trial and error sketch plans followed by critical evaluation of the alternatives, to adapt the typical form to the new site.

There are many references available that describe various design approaches, processes and techniques. The inventory and analysis process is the main focus of LaGro (2003) and the reference used in many design process curricula. Others focus on the form of landscapes (Dee, 2001) or the interactions between people and the built landscape (Laurie, 1986) (Rutledge, 1971). In *Design with Nature*, McHarg (1992) emphasizes the natural process of the environment as an essential resource in almost every landscape architecture program. Perhaps the most comprehensive resource for understanding approaches to design is *Site Planning* (Lynch, 1971). His description of the seven principle approaches to design encompasses those found in most other references. The design process and various techniques are also provided. The seven approaches form the theoretical basis of this research and are described as follows:

4.1 Adaptation

Uses adaptations of solutions used in other circumstances. Usually involves heavy reliance on case studies of similar design issues or sites. An example might be a designer who uses a familiar gridded street system but turned at a 45 degree angle.

4.2 Modular Division

Involves breaking down the problem into parts to be solved independently (disaggregation) to be brought together later and reevaluated (re-aggregation). It could involve physical parts of a site or aspects of the design problem for the entire site. An example would be dividing a large site into smaller tracts or solving pedestrian circulation for the entire site to be combined later with vehicular circulation.

4.3 Optimizing

The designer develops a series of ideal solutions that focus on the various, specific purposes, than seeks to reconcile those idealized solutions. It is usually externally focused on the concept rather than the users. Solving for a specific purposes such as circulation, privacy, shade, enhancing a picturesque view or creating a sense of place are examples.

4.4 Essential Function

The designer focuses on the most important function and solves for that function in the most ideal fashion. All other functions are subordinate and may be compromised in support of the primary function. Examples would include designing a farmer's market to make the function of buying the most important issue. Others might be the function of a university as education as in the case of Thomas Jefferson's Plan for the University of Virginia.

4.5 Problem Solving

Suggested solutions rise directly out of the situation; difficulties, conflicts potentials, rather than starting with the ideal concept and adapting it to a situation. Correctly defining the problem is essential. This is the typical design approach taught in many schools and is preceded by the processes of inventory, analysis, goals, and programming, that is intended to point logically to the problem to be solved.

4.6 Exploring Means

This approach involves free-thinking, open mindedness, drawing from abstract concepts, geometry or other inspirations. The designer must eventually reconcile the abstractions to truly develop a design solution. This approach can use a strong sense of geometry, basing a design on a painting, music or other abstraction such as the use of a word or phrase as inspiration such as "diminishing rhythm."

4.7 Drawing on Consequences

Asking what could happen with various design solutions, either in a virtual sense or in reality as in a trial or test run of an actual built environment. Building a prototype solution, such as a Traditional Neighborhood Development (TND) in a city where one had never been implemented is an example.

5 METHODS

One of the most popular forms of qualitative research is the grounded theory method, which uses the research to “generate or discover and theory.” (Cresswell, 1998, p. 56) However, this study had already identified several theories upon which to base the research. Consequently it is a phenomenological study that “describes the meaning of the lived experiences for several individuals about a concept or the phenomenon.” (Cresswell, 1998, p. 51)

The methods utilized to gather data for this investigation included both participant observation and interviews of landscape architecture students during the spring semester of 2011. There were 27 students registered for my Site Construction and Development class, which dealt with advanced site grading issues such as storm drainage, roadway alignments and storm water management. Six of the students were in the graduate level first professional degree program and enrolled in a class taught in tandem with 21 undergraduate students. The graduate students included two females and four males. One of each gender was from China while the others were from the United States. They were all in their mid-twenties and in the second semester of the three-year, first professional degree graduate program.

The undergraduate students included 6 females and 15 males, all U.S. born and in the late teens to early twenties. They were all in the third year of a five-year, first professional degree program, with the exception of two fourth year students who had fallen behind in this sequence of courses. There was also a fourth year student who volunteered to serve as a teaching assistant in order to keep in practice with the course curriculum.

All of the students met for an 8:00 am lecture followed by separate studios for the graduate and undergraduate students. This diverse group of students held similar positions within the curriculum and provided a range of similar and differential approaches.

5.1 Participant Observation

The use of participant observation allows the researcher to place him/herself in the research and thereby gain access to a wealth of information that might not be available as an uninvolved observer. It allows the researcher's actions to become a part of the data that is gathered and analyzed (Lindlor & Taylor, 2002). However, I was not a complete participant since I was not actually participating in the design process. Rather I was assisting and guiding the students in the implementation of that process. Yet it was a natural role and unobtrusive in the sense that I belonged in that situation and my presence or interaction did not necessarily adversely affect or bias my observations.

The participant observations took place in the respective design studios, usually on the first day that a new project was assigned. The graduate studio was located in an older building in a small but comfortable room with plenty of room for the students' drawing tables, storage lockers and two computer workstations. The room faced south with large windows so there was plenty of early morning sunshine entering the room which made for a positive and warm atmosphere. The Undergraduates met an hour later in the historic agricultural pavilion, which was a large, approximately 6,000 square foot space that was very open with plenty of room for drawing tables and storage lockers. It is the third oldest building on campus and has brick floors, indoor plants and vaulted ceilings with overhead windows that also allowed for a good amount of early morning sun. Both studio spaces are very open and created an atmosphere that tended to be very supportive of creative and interactive learning that defines a design studio.

Participant observation involved approximately three hours of studio observations on the first day that a new project was assigned. During the course of the semester, I observed five separate projects resulting in approximately 15 hours of participant observation. Traditionally, in our program students will work at their drawing tables in their respective studios using hand drafting and drawing techniques. I visited with the students individually at their desks to gauge their progress and provide assistance when needed. This process was commonly referred to as “desk crits” and was an important part of the one-on-one design studio environment. The desk crits offered the opportunity to observe first-hand the students' initial design approach. During the studio I took field notes after I visited each student at their drawing tables. Some of the field notes were then compiled into more complete journals soon after class so as to not limit my time with the students. Students were not identified by name in my field notes or journal. Since the process of compiling field notes into a completed journal was incomplete, they were not available for a comprehensive analysis using traditional qualitative coding methods. However, they were available to triangulate information gathered during the interview phase of the study.

5.2 Interviews

Students were interviewed in order to gain more on-depth, reflective information about how they approached design, what approaches they prefer, and what approach they prefer in particular situations (aesthetic design vs. technical design). All students in the class were invited to participate and informed of the reason for the interviews. They were assured that their identity would remain confidential and that they were free to withdraw from participation at any time. Additionally, they were informed that their grades would not be affected by their decision to participate or not. The invitation was offered on two occasions at the start of lecture and a sign-up sheet was distributed with twelve, pre-determined time slots outside scheduled classroom or studio times. The students were told that the sign-up procedure was first come, first served which reinforced the notion that their participation was completely voluntary.

A total of nine interviews were conducted using a semi structured approach that followed an interview guide (see Appendix A) but allowed for the discovery of information to emerge from the discussion (Goodall, 2008). The interview guide also allowed for the free flow of ideas and follow-up questioning, while maintaining a focus that avoided wondering off on interesting, but unproductive tangents. The interviews were conducted in a collaborative, interactive stance, which fit well with the design studio environment as well as the Department's and my own teaching philosophy. Additionally, the stance helped students feel more comfortable and fit my personality and a rapport based on mutual respect that I feel I have with my students.

The interview guide consisted of a few demographic questions designed to establish some background as to the students previous design experience and whether or not they had transferred into the landscape architecture program. These questions also helped the students relax before asking questions that were more pertinent to the study. A subsequent set of questions regarded design and were indirect in nature. The interview questions were designed to glean from the students a description of how they approached design without asking directly which approach they preferred. This allowed the students to provide their own description which allowed for more extensive responses and far richer information. It also avoided any confusion over different interpretations of the terms being used.

The students were asked what they liked most about being a designer, what the most difficult part was, what was their most challenging project and how did they work through it, what they do when they get stuck on a project, and how they might handle a technical problem differently than a more creative one. Generally, these questions were designed to reveal the students' motivations, the approaches they preferred and some of the techniques they used. They were also asked to describe the characteristics they would incorporate into the design of the best, and worst, studio professor in order to provide additional insight into both what I could do to improve as an instructor as well as what motivates or frustrates them as students of the design profession.

Two additional interviews were conducted using the informant approach. One was with the volunteer teaching assistant (TA) mentioned earlier and the other was with a colleague who was the instructor for the two preliminary design principles and process classes that the undergraduates had their previous two semesters. These two interviews took place after the student interviews were concluded and the questions were variations of the same questions asked of the students. In some cases, new insight was gained while in others, the informant interviews confirmed information that was learned during the student interviews. The interviews, along with my own observations, provides the triangulation that qualitative researchers use to establish trustworthiness (Glesne, 2011).

The student and informant interviews lasted between 27 and 45 minutes each and were recorded with the permission of the interviewees. The student recordings were transcribed as close to verbatim as possible, using Express Scribe software. Transcribing eight of the nine interviews personally (one was transcribed by a secretary) took approximately six hours. In total, the nine interviews resulted in 56 pages of text. Although transcribing the interviews personally was unpleasant, difficult and time consuming, it did result in a much better understanding of the dialog and helped tremendously with the analysis. In fact, the one interview that was transcribed by a secretary needed to be replayed while coding the transcript.

6 VERIFICATION

In qualitative research, the term verification is used in place of the quantitative term validity. There are many procedures that can be incorporated to insure that results are trustworthy and authentic (Cresswell, 1998). In this study verification was accomplished through the use of triangulation whereby

the data were collected from several sources; interviews with students, interviews with a TA and a colleague, participant observation, and the incorporation of member checks, which involves reviewing the data and conclusions with the original participants (Cresswell, 1998). In this case preliminary results were emailed to all of the individuals that had been interviewed. They were asked to review the findings and implications and comment on whether or not they were realistic, were any corrections needed, and did they agree with the information presented. Three of the original participants responded and, in general, all agreed that the data presented was accurate and that the implications were realistic.

7 ANALYSIS

In order to make sense of the data collected, codes were created based on Lynch's (1971) seven approaches, and traditional design implementation techniques. Individual transcripts were reviewed and design approaches color coded on both the transcript and the rubric. The rubrics were then evaluated to identify prevalent themes, relationships among the various categories, and anomalies that provided additional insight. A copy of the rubric can be found in Appendix B

8 FINDINGS

After the coding system was established and the review completed, I was able to identify recurring themes among the transcripts and rubrics. Once the patterns were identified I looked for relationships between the various aspects of the study. For example, I looked to see if there were any consistencies among those students who used a particular design approach to see if they also favored a corresponding set of techniques. The analysis revealed the following five findings that I felt were significant:

1. Most of the time, students used two or more design approaches in combination.
2. Two approaches; Adaptation and Drawing on Consequences, were relegated to technique status as opposed to an approach
3. There does not appear to be any obvious relationship between specific design approaches and the techniques used to implement them.
4. There does not appear to be any obvious relationship between a students' stated difficulty with ideation or implementation and an approach or technique.

8.1 Discussion and Examples

8.1.1 Most of the time, students used two or more approaches in combination.

In almost all cases, students described using a combination of two or more approaches, usually in combination or simultaneously. In other words, their descriptions often included elements from two or more approaches, such that there was no clear cut division between the approaches nor was there a clear cut preference for a single approach.

There were four primary combinations of approaches including: Problem Solving and Optimizing; Optimizing and Modular Division; Essential Function and Problem Solving; and Exploring Means and Modular Division. Consequently, Problem Solving, Modular Division and Optimizing appeared to be the most often used approaches.

Modular Division was often cited when discussing a project that was larger in scale or a more involved technical problem, such as the large Traditional Neighborhood Development (TND) assignment as described by one student "A perfect example is the TND you just saw me working on. I have it split up into four quadrants." (TBone).

The use of Problem Solving and Optimizing by the students would appear to be the result of the emphasis by the department on those aspects of the design process that tend to lead the students toward defining the problem and identifying ideal theoretical solutions. An example is how one student described how he separated pedestrian and vehicular traffic using classic, problem solving terminology: "Yea, uh I had done the non-site specific functional [diagram] and I thought the best way for any space or any size of space to connect them [pedestrians] without crossing the street is to just stick the street on the outside." (Rick)

Students tended to describe using Available Means and Essential Function the least. I am not sure why Essential Function was not described more since the program emphasizes the use of functional

diagrams. There did not appear to be any revealing dialog among the student interviews nor did either of the interviews with the TA or colleague indicate a reason. However, my discussion with the colleague who teaches the formative design classes (principles and process) indicated that the students have a very difficult time switching between the analytical and creative, left and right brain functions. My own observations in the classroom tend to confirm this phenomenon.

There is one very interesting insight concerning design approaches and the apparent combination of approaches that involves two students who were leaving the program. In both cases they were very capable students who put forth considerable effort, but struggled with the design curriculum and had second thoughts about landscape architecture as a career choice. One student did not appear to have any clear focus on an approach to design while the other seemed to be focused solely on a single approach. The first simply used probing as a technique while the other tried to find the most ideal solution every time. Consequently, this fortuitous, although unfortunate situation seems to underscore the importance of having a variety of approaches available rather than depending solely on one approach.

8.1.2 Two approaches; Adaptation and Drawing on Consequences, were relegated to technique status as opposed to an approach

Virtually no one described using either Adaptation or Drawing on Consequences as an approach to design. The students did describe techniques that have similarities with the concepts of these two approaches. For example, many students employed adaptation as a way to break through a mental or creative block by conducting research in the form of books, magazines, or the internet, including Google Earth. The rational for this phenomenon, I believe, stemmed from the students' motivation for becoming designers. While observing students in the studio and in discussions with students in other classes they tend to equate creativity with originality. They are reluctant to even look at other solutions because they feel that ideas and possible solutions need to come from within in some sort of spontaneous, esoteric process. At times they have even described basing their design on another project as plagiarism, even when that project was built and a part of the existing public realm. During the interviews, one student described being in a rut, in just her third year of classes.

"More or less, I mean we do a lot of projects sometimes. I feel like I coming up with the same ideas but I don't want to do the same thing twice. I guess that's pretty hard for me to go out and find new things that inspire me to do something different than what I've already done cause it would be easy to be like oh I've already done this I could just use this same design and I could just put it on here, I mean some people do that.....Yea it's easy to get in a rut." (Bee)

Both the TA and colleague, when interviewed, agreed that sentiments like these were not uncommon and a result from the students' desire to be creative and the feeling that re-invention or adaptation is not creative enough.

With regard to Drawing on Consequences as an approach, it is understandable that students would not be able to utilize this approach. They have neither the time nor the resources to build mockups and gauge users' reactions. However, when students described self-reflection as a technique, they were essentially anticipating what the consequences of their preliminary design solution might be. Similarly, the availability of digital imaging makes it possible to explore potential consequences in a virtual world utilizing focus groups. Other projects might also base a design upon survey research, such as a recent thesis where the student based his recommendations for a bikeway system at a small southern university on a survey of students, faculty and staff. Clearly, though, for Drawing on Consequences to be used as an approach or the foundation upon which a design is synthesized, it would most likely need to be part of the assignment.

There does not appear to be any obvious relationship between Approaches to Design and the Techniques used to implement the approach.

For me, one of the most surprising findings is that there was no clear relationship between a students preferred approach, or approaches and the techniques used to implement that approach. I would have predicted that the approach and the technique would go hand in hand, but that was clearly not the case.

"I like try to pull ideas from like anywhere I can get them. I actually have a bunch of friends who are in art school and I'll get on my face book and they post all of their paintings on

face book and sometimes I'll flip through those to see if I can find anything. If not I'll just try to come up with things and I'll listen to music or something like that." (Bee)

This student clearly preferred using Available Means as an approach. She also said that she got her colors from the music and described both the art and the music as having a certain flow and feel. In her case, the approach seemed to match her techniques since they were very free thinking and open minded. However, another student who was very rigid in his use of the Problem Solving approach also utilized abstracting techniques such meditation and described design in terms of elegance and simplicity. Many students also described various forms of probing which includes testing and evaluating many different solutions and subsequent variations of those solutions, while adopting any number of design approaches.

8.1.3 There does not appear to be any obvious relationship between a students' stated difficulty with Ideation vs. Implementation and an Approach or Technique.

This was another aspect of the study that was somewhat of a surprise. When asked if they had more difficulty coming up with ideas as opposed to implementing those ideas, the responses were evenly divided. More importantly, there was never any hesitation what so ever by any of the students as to which was the most difficult for them. One student said "Ideas come down like rain; it's just a matter of getting all the acidic stuff like pollutants out of the rain and distilling it." (Rick). However, another said that coming up with ideas was like breaking through a dam and that once the dam was broken, the ideas came through and the subsequent implementation of those ideas on the site was the easy part. These analogies are two of the more eloquent examples of what was a clear preference for all of the students. However, while they both expressed difficulty with either ideation or implementation, they both also described a preference for the Problem Solving Approach in other parts of the interviews. Another student indicated a clear preference for the Problem Solving Approach when he said "I am more of the problem statement kind of a guy, because the most elegant solution comes from the most elegant question." (Muddy). However, he was very creative when he explained "Yea, think of it like poetry, a poem that, if it's well written it says a whole lot in not very many lines and its very choice words. That's what I mean about elegant." (Muddy) These examples indicate that there is not necessarily an inherent connection between the approaches that students take to design and the techniques they employ to implement those approaches.

The value of qualitative methodology was also revealed when one considers the notion that, in a quantitative study, the tendency might have been to determine which approach or approaches were favored the most. The researcher/instructor might then want to focus his or her teaching on those approaches, and only those approaches. This study, however implies that all approaches can be valid depending upon the circumstances, and not just those that are the most popular, or the most comfortable for the instructor. Otherwise, the female student who uses music might not have been able to find her colors.

9 FUTURE RESEARCH

This qualitative study revealed a wealth of information on a broad range of issues. Since the profession of landscape architecture is highly vested in the quality of the built and natural environments, it is entirely appropriate to utilize qualitative research as a means to understand and improve the education of future professionals in the field. The current standard for student/teacher ratios promulgated by the Landscape Architecture Accreditation Board (LAAB) is 15:1 in the design studio. At this ratio, it would be difficult although not impossible, to continue a similar interview protocol coupled with a more practiced participant observation effort. However, an adaptation of the process using a focus group or qualitative survey may be more feasible and just as useful. Implementing participant observation as a regular part of the classroom would also be helpful as both a formative and summative form of evaluation of me and my students' efforts.

In summary, the findings of this research are revealing to the point that it would be beneficial to continue with it and develop a longitudinal qualitative study of the ways in which landscape architecture students approach design.

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