A STUDY OF SELF-REGULATED LEARNING IN LANDSCAPE ARCHITECTURE DESIGN STUDIOS

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(ABSTRACT)

Design is a multidimensional activity involving a variety of skills and thought processes, including analytic reasoning, intuition, and creative expression. Learning how to design can be a frustrating and confusing process that some students find difficult to understand. Professors employ a range of strategies when teaching design. These strategies are often based on how their professors taught them with little or no theoretical basis in how students learn. For students, the failure to grasp the process of designing can challenge their willingness to stay motivated and actively engaged in the studio project. The result is less than optimal learning and students that do not achieve their full potential. One important factor that influences design learning is the process of self-regulated learning. Self-regulated learning (SRL) refers to a student's self-generated thoughts, strategies, and goal-directed behaviors. This study examined SRL in landscape architecture design studios in order to find out how students self-regulate their learning and performance on studio projects. Interviews with landscape architecture students were used to answer the research questions. Study findings suggest that landscape architecture students self-regulate their learning on studio projects through a process of engaging in design, then using SRL to address issues that arise during design, then generating more design issues that require additional SRL, and so on. The findings indicate that a student's ability to engage in SRL is based on their understanding of design as a complex set of behaviors and activities. Since students in each year have a different understanding of what designing entails, they use and engage in SRL differently. The findings suggest that high achievement in a design studio is a result of advanced knowledge that comes from the freedom to pursue additional issues beyond the basic requirements of the project. The freedom comes when a student attains the expertise to shift cognitive resources away from learning how to design and redirects them towards risk-taking, personal interests, and learning new information. The study sheds light on how students learn, engage, and self-regulate their learning in design studios and provides design educators with a basis for effective design teaching strategies.

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CHAPTER 1 - INTRODUCTION

BACKGROUND

Landscape architecture is a growing profession that involves the analysis, planning, design, management, and stewardship of the natural and built environments. Most landscape architects in the United States learn the fundamentals of the profession while studying at one of over 70 accredited programs nationwide. While each program offers its own set of unique features, one characteristic that is common among all landscape architecture programs is the design studio. The AIAS Studio Culture Task Force (2002) says that the design studio lies at the core of architecture and landscape architecture education since it "commands the most credit hours, the largest workloads, and the most intensive time commitment from educators and students" (p. 3).

The design studio, often referred to as "studio," is noticeably different from other places on the college campus. Practices regularly observed in typical college classrooms are seldom seen in studio. For example, professors rarely lecture or write on blackboards, and students spend little time sitting at desks taking notes and memorizing facts. Instead, as Paul Kasidowski (1996) notes, studio is a casual place where meeting times are specified but students gather and disperse haphazardly; come and go 24 hours a day; maintain complete and large work areas; and a mix of discussion, critiquing, one-on-one conferencing, sharing, and presenting occurs; complete with couches, snacks, and guests from outside the college. In these ways, studio provides professors and students with a rich environment for teaching and learning.

For professors, studio provides a beneficial background for posing landscape architectural problems and helping students learn to use design, as a means to developing possible solutions. On the other hand, the benefits of studio often create a set of challenges for professors, most notably, the intensive time and effort it takes to guide students through the complex process of learning how to design. The studio can also present challenges to students as well. Foremost among these challenges is a general underutilization of the studio in terms of its capability to facilitate learning how to design. When students do not utilize studio effectively, they not only impair their own learning but also diminish the productivity of the studio environment for those students around them. As a result, students attempting to make the most of their learning in studio must first overcome the obstacle of underperforming students.

In an attempt to assist underperforming students and optimize the studio environment, professors have tried many different strategies. However, most of these strategies have not effectively addressed the underlying problems; namely, the underperforming students' inability to actively engage the studio project and unwillingness to take responsibility for their own learning. Therefore, professors need to discover why underperforming and low achieving students in landscape architecture studios fail to participate actively in their own learning if professors are to address adequately the fundamental problem. Moreover, professors need to find out how students differ in terms of their thinking and behaviors relative to the studio project so that they can use this information as a basis for developing student-oriented intervention strategies.

Self-regulated learning (SRL) holds promise for answering these questions. Self-regulated learning deals with goal setting, motivation, monitoring, and other such issues clearly related to the fundamental problems associated with poor student performance in studio. Understanding why some students are unable to engage in SRL is a vital step in improving landscape architecture education and ensuring optimal learning for all students in studio.

THE DESIGN PROJECT AND SELF-REGULATED LEARNING

Within the studio environment, the pedagogic vehicle for teaching students the skills, knowledge, and experience necessary to enter the profession is the design project. Education researcher Donald Schön (1987) notes that "studios are typically organized around manageable projects of design, individually or collectively undertaken, more or less patterned on projects drawn from actual practice" (p. 43). In a design project, students use design and planning processes to investigate a central problem or set of issues related to landscape architecture. Learning occurs as students, facilitated by the professor, become involved in a largely self-directed process that involves finding, reconciling, and selecting aesthetic and functional solutions to a problem. For the design project to function effectively as a pedagogic approach, students must become active participants in their own learning (Boyer & Mitgang, 1996). In other words, students must become responsible for generating, monitoring, and managing their own thoughts and behaviors.

As the core of landscape architecture education, the studio and design project are critical for teaching students the skills and knowledge to become landscape architects. Therefore,

professors and students must ensure that they optimize the learning potential inherent in the studio and design project while minimizing factors that might undermine learning. In order to do this, professors must find out why underperformers are less likely than other students are to engage the design project, and how these differences influence student behaviors relative to the design project. One key to answering these questions may lie in the theory of self-regulated learning.

Self-regulated learning refers to the learning that occurs largely from a student's self-generated thoughts, feelings, strategies, and behaviors (Schunk & Zimmerman, 1998). The leading SRL authority Barry Zimmerman (2001) says that learning is not something that happens to students; it is something that happens by students. According to Zimmerman, for learning to occur, students must become actively engaged in their own learning processes. While conceptualizations of SRL vary, most researchers agree that SRL involves learners having a purpose or goal, employing goal-directed actions, monitoring their own behaviors, and adjusting their behavior to ensure success (Schunk, 1996). The last two decades of research have established the validity of SRL as an important factor influencing student motivation, achievement, and learning (Zimmerman, 2000). Studies show that achievement and learning in fields such as health, sports, business, and professional writing can be improved through SRL (Bandura 1997, Zimmerman, 1998).

Based on the description above, it seems clear that SRL is occurring to some degree in landscape architecture studios. At least, professors are expecting it of their students. However, what is not clear is how the self-generated thoughts, activities, strategies, and behaviors associated with SRL manifest in landscape architecture students. In other words, if one assumes that SRL is occurring in landscape architecture studios, then: what does it look like, how do students self-regulate their learning and performance on studio projects, and why do some students engage in self-regulation and not others? Adding to this problem, is the fact that research supporting SRL and the claim that it improves students' learning and achievement have never been substantiated in landscape architecture studios. This suggests that not only does finding out more about how SRL occurs in studios inform landscape architecture education, but it also contributes new knowledge in the area of self-regulated learning.

RESEARCH QUESTIONS AND OBJECTIVES

The primary goal of this study is to provide new information that fills a gap in the existing body of knowledge in landscape architecture education. To do this, a set of research questions related to self-regulated learning, and student learning and performance on studio projects are used to guide this study. These research questions address areas within the body of knowledge where information is lacking or unknown. The research questions include but are not limited to the following.

1. What types of self-regulated learning do students in landscape architecture studios engage in?
2. How do landscape architecture students self-regulate their learning and performance on studio projects?
3. How does self-regulated learning on studio projects vary by academic level of the students?
4. What factors are important in a student's ability to engage in self-regulated learning?
    a. What role does goal-setting play in self-regulated learning on studio projects?
    b. What role does self-monitoring play in a student's ability to engage in self-regulated learning?
    c. What role does interaction between students, and students and professor play in a student's ability to engage in self-regulated learning?
    d. What role does motivation play in a student's ability to engage in self-regulated learning?
    e. What role does the studio environment play in a student's ability to engage in self-regulated learning?
5. Why do some students in the studio engage in self-regulated learning and others do not?
6. What is the relationship between self-regulated learning and student achievement?
7. What types of intervention strategies can educators utilize to enhance their students' self-regulated learning?
8. How do the study's findings contribute to the existing body of knowledge in the area of self-regulated learning?

STUDY SIGNIFICANCE

This study is significant for the following reasons. First, the study findings fill a gap within the existing body of knowledge on education and instruction in landscape architecture relative to self-regulated learning. Second, the study merges theories and concepts from landscape architecture, architecture, design studio education, educational psychology, and other fields to create new knowledge that assists professors in helping their students optimize learning. Third, the study examines a rarely studied population – landscape architecture students, in a way that has never been studied before – by examining their self-regulated learning on design projects. Fourth, implications of this study address some of the increasing demands placed on higher education, namely the need for efficiency in places such as design studios where resource use in terms of space and time are high. Finally, at a time when society's recognition and need for landscape architects is growing, it seems counterproductive to provide the public with graduates who were marginally successful as students. Therefore, this study addresses the issue of how to improve student learning and achievement through self-regulated learning.

STUDY ORGANIZATION

This dissertation includes the following chapters: Introduction, Literature Review, Methodology, Results, and Summary and Implications. The introduction discusses the dissertation's topic, defines key terms, and outlines the study's significance. The literature review has two main parts, each containing an analytic synthesis of literature. The first part discusses literature and concepts pertaining to landscape architecture education including the studio and design project. The second part discusses broader educational issues related to landscape architecture education such as problem-based learning and clarifies the construct of self-regulated learning. The methodology chapter begins by briefly discussing the study's qualitative and explorative orientation and then clarifies data collection, interviewing, and data analysis. The results chapter uses interview data to illustrate the study's findings. Finally, the summary and implications explore the implications of the study findings in terms of the research questions and various aspects of teaching and learning in landscape architecture studios.

<u>**CHAPTER 2 - LITERATURE REVIEW**</u>

This study examines how self-regulated learning (SRL) influences a student's performance and achievement on landscape architecture studio projects. In order to complete this study it is important to have an understanding of the current literature and emerging research related to studio teaching and learning. Since learning how to design is the function of the landscape architecture studio and SRL plays an important role in learning how to design, it is also important to review research in SRL and other similar areas.

CHAPTER ORGANIZATION

The chapter is divided into four sections. Section one, "Studio Education," provides a brief historic background of the studio in order to provide a context for understanding the contemporary approaches to studio learning. Section two, "Problem-based Learning," explains the design project in educational terms. In this section, a set of criteria for effective problem-based learning is described and parallels are drawn between problem-based learning, studio projects, and design learning. Section three, "Self-regulated Learning," provides an overview of self-regulated learning and relates it to the studio project in order to show how self-regulated learning can be used to enhance problem-based learning in studio settings. Included in this section is a discussion of goals[1], since they are the foundation of self-regulated learning.

STUDIO EDUCATION

Studio lies at the core of architecture and landscape architecture education (Webster, 2001) since, as Koch et. al. (2002) described in a landmark study of studio culture, "studio courses command the most credit hours, the largest workloads, the most intensive time commitment from educators and students, and imply supreme importance" (p. 3). Practices commonly observed in typical college classrooms such as an instructor lecturing and writing on a blackboard while a student sits at a desk quietly taking notes, are rarely seen in studio. Instead, as Paul Kasidowski (1996) notes, studio is a casual place where meeting times are specified but students gather and disperse haphazardly; come and go 24 hours a day; maintain complete and large work areas; and a mix of discussion, critiquing, one-on-one conferencing, sharing, and

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[1] Goals are defined as the purpose towards which an endeavor is directed. In design, goals are typically generated by the professor, project, and student for the purpose of addressing the design project.

presenting occurs; complete with couches, snacks, and guests from outside the college (Image 1). Thus, studio occupies a uniquely important place on college campuses and in architectural education.

Image 1 – Students Working in Studio: Students engaging the studio project through drawing.

One of the central features of the studio, and its primary teaching and learning vehicle, is the studio project. Students are commonly assigned one or more studio projects during a semester. Each project uses a problem, as John Dewey's would describe one, as a learning catalyst. For John Dewey (1933), a problem is anything that "perplexes and challenges the mind so that it makes belief… uncertain" (p. 13). In terms of the landscape architecture studio project, a problem is any design or planning issue involving doubt, uncertainty, or difficulty that requires a student to actively search for a solution. For example, in order to "solve" the problems posed by a single-family land planning project, students must make the unknown – what principles should I use to organize the design, where should I placed the half acre lots upon the site, how should I integrate the road and pedestrian circulation patterns into the existing topography – known. In this way, learning occurs through basic processes such as finding possible solutions, reconciling conflicting ideas, judging possible outcomes, sharing thoughts with others, and receiving feedback about progress.

Studio projects may address a single problem or investigate many interrelated problems depending on the subject and learning goals of a particular course.

Two additional aspects of the studio that influence a student's performance on the studio project are its multidimensionality and its attempt to simulate a professional office setting. First, studios are multidimensional in terms of learning aims and expectations. This means that in studio, students learn many different types of things at the same time. For example, students learn analytic reasoning, creative behavior, graphic skills, professional behaviors, design process, and other such skills while working on their project in studio. The multidimensional aspect of the studio enriches learning while increasing its overall complexity. A second aspect of studio that influences learning is its attempt to simulate a professional office. Studios in landscape architecture are loosely modeled after a professional office in terms of professional activities, project types, considerations, and management. This aspect of the studio enhances learning by providing an authentic aspect to the studio while preparing students for the future workplace. Both of these aspects influence student learning on studio projects.

While many educators and researchers support the studio's valuable role in teaching students the fundamental skills and knowledge necessary for becoming a professional (Schon, 1983; Dinham, 1989; Boyer & Mitgang, 1996; Koch et. al., 2002), others have strongly criticized it (Ahrentzen & Anthony, 1993; Anthony, 1991; Dutton, 1991; Dutton & Mann, 1996; Ward, 1991) suggesting that studios can be demoralizing, time consuming, and overly biased towards white males. While the body of literature on studio education continues to grow, very few published studies have specifically addressed the studio project from a pedagogic perspective. This study attempts to contribute to the growing body of literature by focusing on the pedagogic implications of self-regulated learning and project-based learning on studio projects.

In order to understand how studios and studio projects fit conceptually within this study, it is important to understand the context in which the contemporary studio project has evolved. Thus, the next section explains how studios have evolved from being predominately teacher-regulated to student self-regulated and from product-oriented to process-oriented – both developments that demonstrate the need for additional understanding of problem-based learning and self-regulated learning in the studio environment.

Studio – Evolution from Product to Process

Landscape architecture and architecture education have many common traditions. For example, both disciplines emphasize designing, utilize studios, employ projects as pedagogic techniques, and share common roots in the Ecole des Beaux-Arts and Bauhaus traditions of education. The educational systems of architecture and landscape architecture resemble each other to such a degree that it is reasonable and necessary, to utilize literature from both fields in order to effectively examine studio education. Thus, the next sections use literature from both architecture and landscape architecture education to explain the relevance of the Beaux-Arts and Bauhaus traditions in studio education and how these traditions, along with recent trends, have resulted in the studio approach used today – an approach that many consider effective but not without it's shortcomings.

The origin of today's studio begins in 19th Century Paris with the Ecole des Beaux-Arts, where early studios called "ateliers" formed the basis of a student's formal architectural training. In the Beaux-Arts tradition, the studio was the professional office of an architect, who served as the instructor or "studio-master," and whose charge was, ensuring the quality of work and deciding when students had learned enough (Frederickson, 1991). In the Beaux-Arts tradition, students learned by participating in projects and by preparing drawings for the studio-master in order to submit them to monthly architecture competitions (Frederickson, 1991). The typical procedure involved the studio-master developing the ideas for the design and then giving it to students who would execute the project by following his instructions. This practice institutionalized the master's knowledge, while reinforcing the students' dependence upon the master for instruction and regulation of learning.

The result of this master-apprentice relationship is a largely teacher-centered studio; the instructor determines timetables, goals, and learning objectives, while the student follows direction and is evaluated according to a formula determined by the studio-master. In addition, since the primary goal of the Beaux-Arts studio-master was to win each competition, there was a strong emphasis placed on the product, thereby diminishing the role of the learning process and the students' independent decision-making opportunities (Frederickson 1991). These traditions are primarily teacher-centered and product-oriented – two characteristics that recent studies have shown to be detrimental to effective problem-based learning and self-regulated learning.

The United States grew exponentially after the Civil War and in the early parts of the 20th Century. During this time, there was a growing need for more architects in the United

States, and thus, many schools of architecture were established and based upon the method and style of the Ecole des Beaux-Arts. This occurred as Americans who studied in Paris returned home and became studio-masters themselves, thus sharing and promoting the Beaux-Arts traditions in the new schools of architecture (Frederickson, 1991). However, there were important differences in the way American institutions incorporated the Beaux-Arts tradition into American architecture education. More subjects and courses in theory, history, and technology were offered to compliment the studio. The frequency, originality, and intensity of studio projects increased, resulting in a move away from competitions and towards projects that allowed for more student participation and interaction (Frederickson, 1991). As student participation in studios increased it also slowly grew less autocratic, allowing various points of view and alternative processes to develop (Fredrickson, 1991). This marked the beginning of an evolutionary shift in studios from the teacher and product-oriented Beaux-Arts tradition towards a more social, student-oriented studio with projects geared more for the student than the teacher. As the influence of Germany's Bauhaus School grew, the small changes that occurred between the Beaux-Arts and American approaches to studio evolved further towards contemporary methods.

The Bauhaus School in Germany, redefined design and design education worldwide, further transforming the studio's role in design education. Walter Gropius began the Bauhaus movement in 1919 as an alternative to existing expressionism and historicism movements.[2] Bauhaus sought to consolidate industrialization, art, and crafts into design that affected everyday life (Frederickson, 1991). Gropius's views on education were revolutionary and influential in modifying the Ecole des Beaux-Art system (Broadbent, 1995).

Frederickson (1991) outlines three differences between Ecole des Beaux-Art and Bauhaus educational beliefs. First, the Ecole des Beaux-Arts viewed knowledge as embodied in historical precedent, while Bauhaus viewed knowledge as creativity, synthesis, and innovation derived from an array of sources, including the student. Second, Ecole des Beaux-Arts instructors rarely discussed social or functional issues, while Bauhaus fully integrated social and functional issues into design; at times even letting these issues lead the design process (Broadbent 1995). Finally, the industrial machine metaphor led Bauhaus instructors to favor design process over design product.

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[2] Expressionism in architecture involves distortion and abstraction. Historicism in architecture involves a return to the past, most often gothic.

In making these three changes to the studio, Gropius changed the roles of the student and teacher. For example, in order to effectively address complex social and functional issues related to architecture Gropius empowered students to become active participants in the learning process by giving them additional decision-making capabilities and responsibility for the studio project. In addition, by emphasizing process over product, the project became less about representing a solution and more about solving problems. In these ways, the Bauhaus reinforced and promoted a larger role for the student and a less commanding role for the instructor thus increasing the need for the student to engage in self-regulation, effective problem-solving, and social collaboration.

The previous section shows how early studios, which were largely teacher-centered, product-oriented places where the studio-master would regulate daily activities, evolved into student-centered, process-oriented places where social interaction between students and between students and teachers is an important element for effective learning. The evolution of studio has led to a greater need for students to become more responsible for their actions in studio if effective learning is to occur.
As the next sections shows, this means students need to become more actively engaged in the studio project, while taking the self-initiative to set goals, monitor learning, and respond appropriately.

<u>Studio – Contemporary Issues</u>

Numerous studies and reports have examined the value and problems associated with contemporary studio education. These studies tend to revolve around several themes including (1) studio culture (Koch et. al., 2002, Anthony, 1991); (2) juries, critiques, and assessment (Anthony, 2001, 1991); (3) design, design processes and methodologies (Attoe & Mugerauer, 1991; Corner, 1992); (4) studio's societal implications (Malecha, 1985, Cuff, 1991); (5) gender and race (Anthony, 2001, Anthony & Grant, 1993); (6) project reporting (i.e., description and images from a project deemed interesting or successful, these represent the most common type of study in this area); and (7) pedagogic techniques. This last theme, pedagogic techniques, contains most of the studies relevant to design learning and self-regulated learning. Unfortunately, only a few studies focused specifically on teaching, learning, and instructional design have been published to date. Those studies that are most pertinent to this dissertation are discussed below.

Most recent discussions about studio education, professional education, and the utility of the design project usually begin with the seminal work of Donald Schön. In Schön's most notable works, <u>The Reflective Practitioner</u> (1983), <u>The Design Studio</u> (1985), and <u>Educating the Reflective Practitioner</u> (1987), he uses the architecture studio and the design project as exemplars of professional education, because they, more than any other methods, tend to respond to the complexities of the real world and the actualities of professional practice. Schön's work has helped legitimize the use of studios and projects in architecture education by recognizing the value of these methods for professional education on college campuses.

In <u>Educating the Reflective Practitioner</u> (1987), Schön analyzes several historic epistemological positions that have implications on design teaching. Based on his analyses, he suggests a new approach to educating professionals that recognizes the need to respond to uncertainty, instability, and uniqueness, through a combination of intuitive processes that he calls "knowing-in-action," "reflection-in-action," and "reflection-on-action." The essence of these concepts is the notion that "action" is the key factor in how professionals solve complex, ill-structured problems such as those faced by architects, landscape architects, engineers, and teachers.

In Schön's view, action, or engagement with the project, is necessary for problem-solving because complex, professional problems are dynamic and their solutions need to be sought after rather than passively absorbed. Problems are then solved, according to Schön, by identifying and framing them through active engagement within contexts that permit a solution to be discovered (Kvan, 2000). In other words, in order to learn how to solve a professional-type landscape architecture problem, a student must actively engage the project's problem within a studio – a setting that simulates an authentic context thereby helping simulate real world problem-solving. Schön's emphases on process over product; complex problem-solving; authentic, real-world problems; and embedding problem-solving in professional-type settings has created a theoretical foundation for architecture and professional education that mirrors the foundation of the pedagogic technique known as problem-based learning (Koschmann, et. al., 1994).

In addition, two pedagogic implications of Schön's theoretical perspective are highly congruent with the concept of self-regulated learning. First, Schön's recasting of the student' role in studio to that of an active participant that searches and engages a problem and the teacher's role to that of a facilitator that models how to act and think, reflects self-regulated learning's

basic conception of the student-to-teacher relationship. Second, Schön's notion of a "plunge paradox" that is inherent in learning professional problem-solving.

> "In the architecture studio, the paradox inherent in learning to design places the student in a predicament. He is expected to plunge into designing, trying at the very outset to do what he does not yet know how to do, in order to get the sort of experience that will help him learn what designing means. He cannot make an informed choice to take this plunge because he does not yet grasp its essential meanings, and his instructors cannot convey these to him until he has had the requisite experience. Thus, he must jump in without knowing – indeed, in order to discover – what he needs to learn" (Schön 1987, pg. 93).

In Schön's view, a student learns by doing, through self-initiative and self-discovery he or she gains a knowledge base that informs future decision-making. Furthermore, Schön contends that it is difficult for the instructor to provide a student with specific direction unless the student has acquired some degree of experience by first plunging into or engaging the project. In these ways, self-regulated learning is congruent with Schön's plunge paradox in that both concepts support the notion that a student learns by doing, or more specifically, by first doing for himself or herself.

Since Schön's seminal work was published, many people have attempted to build on his work. However, as Helena Webster argues in her 2001 study:

> "…other than the work of Schon, there has been surprisingly little in-depth examination of the design studio as a learning environment, or of the design project as an effective and relevant pedagogic tool. It is notable that there is almost no literature, let alone research, within architectural education that considers the advantages of project-based learning over other forms of learning, or exactly what and how students learn through project-based learning method, let alone how the quality of design teaching might be improved" (p. 2).

While this study supports Webster's assertion that there is a lack of published research associated with the use of projects in studios, she does make one important mistake early in her critique; she confuses the terms projects and project-based learning. The problem underlying Webster's mistake is actually a common problem that should be avoided when discussing studio project pedagogy. She takes that fact that projects are used for learning in studios to mean that studio's use the pedagogic technique known as project-based learning. However, this is not the case, since the literature in education draws a distinction between project-based learning (i.e., product-oriented practicum) and problem-based learning (i.e., process-oriented problem-solving). Thus,

since the studio project in architecture and landscape architecture tends to focus on the process of design and problem solving, it is more akin to problem-based learning than project-based learning.

Nonetheless, this study recognizes the value in Webster's (2001) work. In her study, she uses a case study method that she calls the "design diary" as a data collection tool. Using this method, Webster had a group of architecture students record their thoughts and reflections on their design process in a journal. Unfortunately, Webster does not explain how the journals were analyzed. She does however offer one important conclusion, a student's design abilities are enhanced when he or she understands more about their own learning processes – a notion also reflected in Schön's plunge paradox. Since self-regulated learning helps students understand more about their own learning processes it seems reasonable to assume that self-regulated learning would lead to improvements in student design ability. Despite the differences between Webster's work and this study, they do share one important similarity – both support the notion that educational concepts which tend to be implicitly a part of existing studios such as self-regulated learning or problem-based learning, should be more thoroughly researched in order to improve our understanding of teaching and learning in studios.

A 2001 study by Thomas Kvan addresses a common issue emerging in architecture education – the role of the virtual studio project. The virtual studio project is a project whereby students supplement the learning that occurs in a traditional studio by interacting with the project and each other online using a computer. In Kvan's study, 70 architecture students at the University of Hong Kong used an internet "web-board" to share ideas and pose questions for the instructor. Kvan uses observations and anecdotal information obtained from students and instructors as a basis for his conclusions that primarily suggest that the text and written components inherent in the online program increased student engagement with the project. However, the real value of Kvan's work, as it relates to this study, is his argument that problem-based learning is highly compatible with the work of Schön.

> "Schön's formulation of the method as "reflection-in-action" has permeated the teaching of many other professions, including teaching itself. In recent years, we have seen another theoretical framework appear, that of problem-based learning (Koschmann, et. al., 1994). Those who teach architecture are proud to note that studio teaching predates problem-based learning by many decades, if not a century. Common to both of these theories of teaching is that they are process focused, not looking at the ends themselves" (p. 6).

A key component of Kvan's study is his interpretation of Koschmann's, (Koschmann, et. al. 1994) model of problem-based learning and his attempt to adapt it to the studio project. Kvan's interpretation identifies five steps occurring within problem-based learning on architecture studio projects: (1) problem formulation, (2) self-directed learning, (3) monitoring progress, (4) representation, and (5) reflection. Kvan notes that the first three steps of this model are iterative, meaning that students will cycle through these three stages until they have enough information to convey a solution for the problem effectively. Action, a critical component in Schön's view of professional learning, is also a prerequisite for Kvan's model, as it is in most other conceptions of problem-based learning.

It is important to note that the basic steps of Kvan's model strongly correspond with the basic process of self-regulated learning outlined by noted researcher Barry J. Zimmerman (2001). In Zimmerman's model, one finds the five steps of Koschmann and Kvan's problem-based learning model compressed into three recurring phases along with critical components of self-regulated learning such as goal setting, social modeling, and motivation. In Zimmerman's view, self-regulated learning involves (1) forethought or planning, (2) performance, and (3) reflection. The similarities between the two models begin to suggest consensus on a framework for understanding problem-based learning that is rooted in the concept of self-regulated learning; a concept which itself shares Schön's notion that students contribute actively to their own learning (Pintrich et. al., 1986).

Later sections of this literature review will explain Zimmerman's model and its associated components in detail, however, at this point it is important to recognize that Zimmerman's and Kvan's models of self-regulated learning and problem-based learning, respectively, are compatible with one another and attuned with Schön's view of the studio project. The next section builds on the work of Schön, Webster, Kvan, and others who have studied the studio project by relating their efforts more clearly to the educational approach known as problem-based learning.

The studio and design project lie at the core of landscape architecture education. Their emphasis has evolved over the last 100 years from a product to a process emphasis. Today, students have a great deal of input in the type of project and amount of instruction that they need. In addition, students are often able to choose the different issues that they want to explore by using the project. This creates opportunities and challenges. For students that understand the

complex nature of the design process, there is an opportunity to use it as a vehicle for taking creative risks and for learning new things. For students that do not understand how to design, the challenge of the design project can be overwhelming. For these students, it will be difficult to meet Schön's basic criteria since becoming engaged requires the pre-condition of understanding what one needs to become engaged in. The next section discusses the design project through an educational lens – the concept of problem-based learning.

PROBLEM-BASED LEARNING

In studio, students learn by actively engaging a design or planning problem associated with a project. In the lexicon of education, this type of learning is known as problem-based learning. There are various definitions of problem-based learning (PBL), but it's most simply defined as the learning that results from the process of working toward the understanding or resolution of a problem (West, 1992). In PBL, a teacher who serves a guide or facilitator, provides students an ill-structured problem which is messy and complex in nature; requires inquiry, information-gathering, and reflection; is changing and tentative; and has no simple, fixed formulaic, "right" solution (Finkel & Torp, 1985).

As a teaching model, PBL was originally developed in medical schools as an alternative to traditional, lecture-based teaching approaches that tended to encourage memorization of facts, while reducing the students' opportunities for making connections between what they were told and how it actually applied in medical settings (Savery & Duffy, 1995). By 1991, over 100 medical schools in the United States had embraced PBL to varying extents, and PBL is now an entrenched component of medical school programs around the world (Jonas, Etzel, & Barzansky, 1991). Problem-based learning's efficacy in medical education has led a number of other professional disciplines such as business, education, law, engineering, and architecture to adopt and adapt PBL to their own professional needs (Savery & Duffy, 1995). Architecture and landscape architecture studios, without specifically calling it PBL, have essentially used a PBL approach since Walter Gropius and his Bauhaus movement.

Purpose and Potential

The purpose of PBL is to teach students problem solving skills and applied knowledge by embedding learning in the process of solving an authentic problem within a professional setting (Albanese & Mitchell, 1993). Finkle (1998) says that the basic instructional sequence of PBL

involves four phases: engagement, inquiry, performance, and debriefing. A review of literature suggests that PBL has the potential to foster the following student capabilities: (1) creativity and critical thinking, (2) adoption of holistic problem-solving skills, (3) appreciation of diverse viewpoints, (4) successful team collaboration, (5) effective communication skills, (6) leadership skills, and (7) the use of relevant and varied resources (Barrows & Tamblyn, 1980; Engel, 1997; Hadwin, 1996; and Hsu, 1999). In these ways, the purposes of PBL correspond with Schön's (1987) recommendations for professional education and the pedagogic intentions of the landscape architecture studio project.

While the list of capabilities that PBL can potentially foster tends to make the approach appear extremely valuable, which it often is, PBL is not without its possible problems. For example, when ineffectively executed by students and/or teachers, PBL discourages the same capabilities it claims to promote, while consuming large amounts of time, confusing students, and making assessment difficult (Savin-Baden, 2000). Despite these potential pitfalls, PBL's potential for fostering the student capabilities listed above is optimized by meeting a set of pedagogic criteria. According to Savery & Duffy (1995), four criteria are critical for optimizing PBL including (1) an authentic, complex problem; (2) a learning environment that simulates a professional setting; (3) a teacher that serves as a facilitator or guide; and most importantly for this study, (4) the use of self-regulated learning.

In studios, the studio teacher is charged with ensuring that the project meets the four critical criteria listed above. In most cases, the studio teacher has little difficulty meeting the first three criteria: presenting students with an authentic problem, utilizing the studio setting, and serving as a helpful facilitator. However, it is the fourth criteria, self-regulated learning, that creates the most difficulty for the studio professor and poses the biggest threat to effective PBL on studio projects.

The difficulty that studio teachers face in terms of ensuring student self-regulated learning lies in the reality that the teacher can't fully direct or regulate the student's problem solving effort because professional problem-solving is largely individualized even in social settings and, as Schön pointed out, participation of the teacher involves demonstration and critique rather than collaborating in the doing (1987). In fact, PBL was developed in order to replace the practice of telling students what to do by giving students the ability to make decisions and discoveries on their own (Hadwin, 1997). Therefore, the problem associated with self-regulated behavior and PBL in studios is twofold. First, to a large degree, the effectiveness

of PBL necessarily relies on the student's, not the teacher's, willingness and ability to regulate his or her learning and behavior (Hadwin, 1996). Second, very little is known about how students in PBL settings actually regulate their learning, especially in terms of those students who have experienced success in self-regulating their own learning. Thus, this study focuses on how students' self-regulate their learning in order to understand its role in promoting optimal PBL in landscape architecture studio settings so that students and teachers can reap the benefits of PBL.

Problem-Based Learning – Key Considerations for Self-Regulation

A review of literature in the area of PBL shows that very few studies specifically address self-regulated learning. However, some studies indirectly address self-regulation by focusing on two themes: self-directed learning and goal use. Therefore, studies related to these themes represent the current thinking in terms of the relationship between self-regulated learning and PBL. The following section utilizes these two themes as a framework for discussing several important studies. The section concludes with a short discussion of several common methodological approaches that are used by researchers to study PBL.

Self-Directed Learning

Self-directed learning is a process in which individuals take the initiative, with or without the help of others, to diagnose their learning needs, formulate learning goals, identify resources for learning, select and implement learning strategies, and evaluate learning outcomes (Knowles 1975). The primary differences between self-directed learning and self-regulated learning is that self-directed learning generally refers to adult education and strictly emphasizes individualized learning while self-regulated learning is more holistic, considering learning at all levels while emphasizing that even individuals learn within social settings. In both views, learning is a result of an individual learner's initiative and explicit decision to do certain things rather than directions from a teacher or the quality of a subject. Since self-directed learning and self-regulated learning are very similar, it is useful to review several studies related to PBL and self-directed learning.

Ryan (1993) attempted to identify a learner's own beliefs regarding the importance of self-directed learning. He found that most students thought that self-directed learning was important and that they felt it grew more significant as the semester progressed. However, he did

not attempt to show a relationship between student's perceptions of the importance of self-directed learning and their academic achievement within PBL. Despite this shortcoming, Ryan did find that a mutual relationship exists between PBL and self-directed learning in that one cultivates the other as the student progresses and becomes more deeply engaged in the problem – a finding that supports a central belief posited by this study.

Dolmans and Schmidt (1994) examined how the availability of resources (e.g., tutors, books) and content organizers (e.g., lectures, exams, lists) influenced students' self-studying and self-directing patterns. In this study, the researchers found that students were impacted to different degrees by the availability of reference lists, course objectives, lectures, examinations, and tutors. For example, first year college students relied heavily on available resources and content organizers, while students in later years tended to be more self-directed, relying less on resources and even less on content organizers. The researcher's conclusion was that advanced students are more selective about the use of available resources and more capable to obtain additional resources as necessary. One shortcoming of this study is that it fails to explain why student self-directed learning patterns become more sophisticated over time and how this influences learning outcomes.

As students progress in landscape architecture studios from first year to fifth year, teachers typically give students less and less project-related resources; instead, teachers expect students to find these resources on their own as needed. In most cases, Dolman and Schmit's (1994) findings are supported in that more advanced (i.e., fourth and fifth year) students are better at self-directing their own learning. However, there are always a number of advanced students in landscape architecture studios that do not support Dolmans and Schmidt's findings in that they often seem lost and unable to find the help that they need. In this way, advanced student underperformance is a result of an inability to self-direct. If more information was known about student self-regulation in studios, particularly effective self-regulation techniques, then this information could be used early in students' academic careers in order to assist them in building the capacity for developing self-regulated learning skills that will help them later as they are expected to work more independently.

While self-regulated learning researchers' support the notion that students who are taught self-regulated learning develop a lasting skill set that they can use on future tasks (Zimmerman and Schunk, 2001), several researchers in the area of PBL are investigating how the development of self-regulated learning within PBL environments contributes to the development of lifelong

learning skills. For example, Barrows (1988) suggests that PBL, specifically the self-directed learning aspects of it, encourage students to develop lifelong learning skills. In addition, Hsu (1999) proposes that PBL allows students to determine "what and how to learn on their own in order to ensure lifelong learning skills and the ability to be effective and independent learners" (p. 200). While PBL and self-directed learning can help build lifelong learning skills, the ability to become a capable self-directed learner is something that is improved by providing students instruction.

Taylor and Burgess (1995) point out that it is important to recognize that each student starts self-directing their learning at a different level of sophistication. In Taylor and Burgess's (1995) study, students were asked to reflect on their experiences related to self-directed learning within PBL and write down their thoughts. Using content analysis, the researchers found that in terms of understanding the teacher's expectations, recognizing the different roles of the participants, group learning, and time management, each student began self-directing at a different starting point. They concluded that without providing students instruction on how to self-direct their learning, students would start out learning at different levels and that these levels would likely persist and even diverge over time. The result is an increasing gap between those students who are capable of self-directing their learning and those who are less capable.

Taylor and Burgess's conclusions along with those of Dolmans and Schmidt (1994) and others researchers in this area, suggest that a student's capability to self-regulate his or her learning differs at the beginning level of a course or studio and that this difference persists, eventually resulting in an ever increasing gap between those who are capable and those who are less capable of engaging in self-regulated learning. Furthermore, this research suggests that this "self-regulation gap" is a primary predictor of academic achievement. It is important to note that these studies also suggest that by encouraging students to develop self-regulation skills, especially early in their academic careers, the gap can be limited. This dissertation investigates how students self-regulate their learning at different year levels in their program and their achievement levels in landscape architecture studios in order to examine the existence of a self-regulation gap and to understand the self-regulative behaviors of those students who are more successful and less successful in their academic achievement.

Goal Use

　　One characteristic common to PBL and self-regulated learning is the importance that both concepts place on goal use as a function of learning. For example, a 1996 study by Hadwin examines the relationship between PBL in medical settings and the strategic content learning approach for promoting goal use through self-regulated learning (Butler, 1994). Hadwin uses as her central claim, that while different forms of PBL integrate self-regulated learning at different levels, "they all strive to structure the learning environments so as to encourage students to take responsibility for setting learning goals and experimenting with ways to meet those goals in a group setting" (p. 5). Hadwin's position here is strongly rooted in self-regulated learning theory, as Zimmerman (2001) confirms, self-regulation involves learners having a purpose or goal, employing goal directed actions, monitoring their behaviors, and adjusting goals and behaviors to ensure success. Thus, Hadwin sees goals as a bridge between self-regulated learning and PBL.

　　In her study, (1996) Hadwin uses an instructional approach known as strategic content learning (Butler, 1994) as a theoretical framework for her study. Using observations and interviews with student participants, Hadwin found that two factors strongly influence goal use and self-regulated learning within PBL, (1) the instructional design of the PBL environment and (2) the critical role of the teacher in PBL. In terms of instructional design, Hadwin found that goal setting, particularly setting learning-oriented goals and knowing how to achieve them, increases when PBL allows for collaboration amongst students and students and teacher. This occurs for several reasons, including the sharing of knowledge and expertise amongst participants and the opportunity to model the behaviors of successful participants. According to Hadwin, by watching and interacting with one another, students learn the types of goals that lead to success, as well as, the self-regulative strategies needed for reaching those goals.

　　In terms of the teacher's role and student goal use in PBL settings, Hadwin (1996) says that teachers should encourage students to: a) take turns facilitating PBL sessions; b) learn more about the issues, content, and expectations; c) and discuss what they're learning in relation to the project's problem. Furthermore, Hadwin suggests that teachers should take the time to acculturate students into a community of learners in order to facilitate the type of collaborative inquiry that leads to increased goal use. According to Hadwin this means orchestrating a simulated environment whereby students learn to negotiate and communicate with each other in a manner that resembles that of a professional. However, Hadwin cautions that "learning to self-

regulate is as novel a process for the teacher as it is for the student" (p. 22). In other words, teachers must learn to embrace a new role, as Ryan (1993) says:

> "The process of transition from dependence to independence as learners can be difficult for both the teacher and the students. The teacher may be unwilling and/or unable to shift the responsibilities for learning to the students; and the students, too, may have difficulty in changing dependent learning practices" (p. 55).

In landscape architecture studios, the teacher is usually comfortable assuming the type of roles mentioned by Hadwin (1996) and Ryan (1993), since facilitating the project has been a long standing tradition in studio education. However, this does not necessarily mean that the studio teacher facilitates effective self-regulation. In any event, students are often ill-prepared, or as pointed out earlier – prepared differently, for the type of effort and behavior that the studio teacher expects of them. In cases such as these a student's performance may begin to suffer and the studio teacher may recognize the need to intervene. The question this raises for the teacher is then: how do I effectively intervene? Since one reason for a student's poor performance within a PBL setting is poor self-regulation (if we assume that the problem is authentic, the environment simulates a professional setting, and the teacher is serving as a facilitator), then the teacher may intervene by encouraging additional, more effectual self-regulation. In order to do this, the teacher must first identify and help the student eliminate unproductive self-regulating tendencies that are causing the poor performance and then know enough about self-regulated learning in order to devise a self-regulative remedy. Two objectives of this study are to provide a list of tendencies that helps studio teachers identify effective or ineffective self-regulating behaviors in their students and to present a framework of self-regulated learning that helps studio teachers understand how the concept influences student learning on projects.

Methodological Approaches for Studying Problem-Based Learning

It is important to note that a majority of the studies on problem-based learning, particularly those that are relevant to self-regulated learning, typically utilize self-reporting and survey methods such as questionnaires and interviews as methodological approaches (Jost, et. al., 1997; Kachgal, et, al., 2001; Lunyk-Child, et. al., 2001). Furthermore, researchers who have utilized these methods support the validity of these approaches. For example, a 2000 study by Howard and others used a self-reporting survey instrument to measure student self-regulated learning within PBL settings. Their primary goal was to demonstrate the validity of their self-

reporting instrument. They found that self-reporting, including the use of a questionnaire, is a reliable method for investigating self-regulation in PBL settings. Simpson and Rush (2003) also used self-reporting as a methodological approach in their study of college students' preparedness in terms of self-regulation. In this study, content analysis was used to analyze the highly descriptive self-reported data (e.g., open-ended responses to questionnaire items) in order to understand the degree to which individuals entered college prepared to self-regulated their learning and the degree to which a student's preparedness changed as a result of instructional intervention by the teacher.

In another study, Hadwin (1996) used "a semi-structured interview approach – loosely following, but not strictly adhering to, a set of questions" (p. 8) to investigate 29 medical students' ability to use goals to self-regulate their learning. Hadwin used content analysis techniques to identify themes within the interview data and then used those themes to organize the presentation of individual "units of dialogue" (p. 10). Hadwin reports that interviews are essential for investigating self-originating processes such as self-regulated learning. Furthermore, her study, along with other studies (Kachgal, et, al., 2001; Lunyk-Child, et. al., 2001; Simpson & Rush, 2003), suggests that content analysis is a useful technique for analyzing qualitative data related to self-regulated learning and PBL.

Since this dissertation examines how students self-regulate their learning on studio projects and since self-regulated learning is a highly personalized process, it is necessary to question students themselves in order to find out the latent details associated with their self-regulation. Therefore, since the literature supports the validity and appropriateness of interviewing as methodological approach – interviewing is used as a research method in this dissertation. Furthermore, the primary data analysis technique will be content analysis.

Previous sections of the literature review have shown that the knowledge and skills developed through PBL are similar to the knowledge and skills that landscape architecture students should develop from a studio project. Furthermore, the literature supports that self-regulated learning helps optimize the potential for PBL to cultivate student learning capabilities. Therefore, as a result of developing greater self-regulated learning, students increase their learning capabilities and achievement on projects. The next section further explains the concept of self-regulated learning and its relationships to PBL and the studio project.

SELF-REGULATED LEARNING

This chapter describes the concept of self-regulated learning (SRL) and explains how SRL helps optimize PBL in landscape architecture studios. For over 30 years, researchers have been investigating a range of variables related to student achievement and learning. More recently there has been a growing interest in the concept of SRL in terms of how educators view achievement, says Barry J. Zimmerman (1986), a leading researcher and proponent of SRL. Zimmerman (2001) defines SRL as:

> "Neither a mental ability nor an academic performance skill, self-regulation refers instead to the self-directive processes through which learners transform their mental abilities into task-related academic skills. This approach views learning as an activity that students do for themselves in a proactive way, rather than a covert event that happens to them reactively as a result of teaching experiences. Self-regulated learning theory and research are not limited to asocial forms of education… but can include social forms of learning such as modeling, guidance, and feedback from peers, coaches, and teachers. The key issue defining learning as self-regulated is not whether it is socially isolated, but rather whether the learner displays personal initiative, perseverance, and adaptive skill in pursing it" (p. 1).

According to Zimmerman (2001), there are several "prominent theoretical perspectives on SRL – operant, phenomenological, information processing, social cognitive, volitional, Vygotskian, and cognitive constructivist" (pg. 1). Each perspective has its own features and distinctive approach. However, there are two fundamental beliefs underlying any theory of SRL: proactive engagement and student choice (Zimmerman, 1986; Butler, 2002).

Self-regulated learning theorists believe that "learning is not something that happens to students; it is something that happens by students. They assume that, for learning to occur, students must become proactively engaged." (Zimmerman, 2001, p. 33). As discussed earlier, proactive engagement with a project is also a critical element of effective PBL in studio settings. The notion of proactive engagement underlies the second fundamental belief of SRL, student choice. As Savery and Duffy (1995) contend, "If students are to engage in authentic problem-solving, then they must own the problem…the learners must perceive the problem as a real problem and one which has personal relevance. Of course, also central is the fact that the learners have ownership of the problem – they are not just trying to figure out what we want" (p. 36).

In SRL, learners must have ample ownership and decision-making opportunities within the learning situation, rather than having decisions made for them. In other words, when a teacher or other individual externality regulates each aspect of a problem, then a student does not need to self-regulate since everything is regulated for him or her. A study by Zimmerman (1994) confirms that SRL varies from high to low depending on the amount of choice learners have and what they choose to do with it. As discussed earlier, most studio projects are not completely regulated by the teacher, rather, as a part of professional education the teacher expects the students to make many important project-related decisions. Therefore, since teachers expect students to proactively engage the studio project, while assuming ownership and decision-making responsibilities, the need for SRL on studio projects is essential.

The Social Cognitive View of Self-Regulated Learning

This section focuses on one of the prominent theoretical perspectives on SRL, the social cognitive learning view. This theoretical perspective is being discussed because more than other theoretical views it "renders students' self-regulated learning processes observable… proving helpful in guiding academic analysis and interventions" (Zimmerman, 1989 pg. 337). Furthermore, since studio is a highly social setting and the social cognitive view addresses many of the same issues influencing both PBL and SRL, it seems that the social cognitive learning theoretical perspective provides the best framework for discussing SRL on studio projects.

Social cognitive learning theory states that large amounts of learning occurs within social environments because in social settings people can observe others in order to acquire knowledge, rules, skills, strategies, beliefs, and attitudes (Schunk, 1996). One distinguishing feature of social cognitive learning theory is the prominent role it assigns to self-regulatory capacities. "By arranging environmental inducements, generating cognitive supports, and producing consequences for their own actions, people are able to exercise some measure of control over their own learning" (Bandura, 1977, pg. 13). From a social cognitive perspective, "self-regulated learning involves a sense of personal agency to regulate other influences, such as emotional processes, as well as behavioral and social-environmental sources of influence" (Zimmerman, 1995, p.218). In terms of landscape architecture studios, the social cognitive learning view includes not only students becoming responsible for their own learning but also developing the capability to direct and control its influences on their behavior and interaction within the social environment (i.e., students, teachers, resources, etc.).

Researchers and theorists have identified several different components underlying SRL within the social cognitive learning view (Bandura, 1986; Schunk, 2001; Zimmerman, 2001). Six of these components are particularly influential in terms of PBL in studio settings. They include: (1) goal use; (2) learning orientations; (3) self-efficacy beliefs; (4) key interrelated processes of self-observation, self-judgment, and self-reaction; (5) modeling; and (6) environmental management. The next sections use the six components as a framework for presenting the current thinking related to SRL in the social cognitive view. Each of these are discussed in more detail below.

Goal Use

Design educator Marvin Malecha (1985) says, "In the search for appropriate (design) strategies, the designer recognizes their accountability for limited resources of time and materials… priorities are established through the identification of values and goals (p. 16)." Malecha's beliefs about goals on studio projects are consistent with the SRL belief that goals are the foundation of SRL in that a learner attempts to regulate his or her actions, thoughts, and emotions in order to achieve a desired outcome.

Goals provide the standards or reference criteria against which progress is monitored and abilities are judged (Barone, Maddux, and Snyder, 1997). A student's degree of satisfaction with their performance and subsequent behavioral reaction is determined by self-evaluating their progression toward goals. Thus, students and their teachers create incentives by making satisfaction contingent on a specific level of performance, or attainment of goals (Bandura, 1986, Locke and Latham, 1990).

A growing body of research (Bandura, 1986; Locke & Latham, 1990; Schunk, 1994; Zimmerman & Kitsantas, 1999) suggests that goals benefit learners the most when they meet the two following criteria. First, goals should be task-specific rather than general. For example, a task-specific goal is: I want to design a parking lot that uses both 90 degree and angled parking spaces to maximize the total parking. A general goal is: I want to design the best parking lot I can design. Second, goals should be challenging but not unrealistic. For example, a challenging goal might be trying fit 50 parking spaces onto a confined site. An unrealistic goal might be trying to fit in 75 spaces onto the same site.

According to a study by Barone, Maddux, and Snyder (1997), when students commit to goals that are both specific and difficult, they perform better than when they have no goals at all.

Barone, Maddux, and Snyder (1997) found that learners that set general goals, long-term goals, absolute (i.e., unchanging) goals, or nonhierarchical goals will typically become less motivated and less successful. Locke (1991) and Locke and Latham (1990) agree, suggesting that when a student's goals are specific but too easy, or when his or her goals are too vague (e.g. "Just do your best."), then the individual fails to perform at his or her greatest. The negative characteristics of goals pointed out above, "detract from efforts to self-regulated because: a) learners who lack specific goals are often unsure about what to do next, b) learners who set long-term goals must wait long periods for corrective feedback, c) learners who set absolute goals are often discouraged about their seemingly slow progress…" (Zimmerman & Schunk, 2001, pg. 295).

The work of Locke and Latham (1990, 1991) suggests that regardless of their specificity, difficulty, and proximity, goals will not influence motivation and behavior unless the learner has information along the way concerning how well they're progressing toward their goals. They refer to this information about a student's progress toward goals as goal-based feedback. When students' have goals and are provided goal-based feedback on their progress, then they will perform better than when they have only goals or only performance-based feedback (Locke & Latham, 1990). Goal-based feedback can come from a variety of sources including the teacher, other students, or the learner himself or herself. In studios, each source of feedback is valuable and contributive to a student's self-regulation. However, it is important to note that any source of feedback should correspond to a student's goals and that a student should set goals that respond to the feedback that they receive (Locke & Latham, 1990). Self-regulation corresponds so strongly with a student's goals that by identifying and analyzing a student's goals a teacher can reasonably discern three things, the degree to which a student is self-regulating, whether or not the student's efforts are likely to be productive, and the type of feedback that will help students most.

Learning and Performance Orientations

Self-regulated learning researchers identify two different goal-related orientations that a learner assumes: (1) goal or learning-oriented and (2) performance-oriented. With a learning orientation, a student places value on competency and desires to achieve competence by either acquiring additional knowledge or mastering new skills. Ames (1992) says that learning oriented goals tend to focus a student's attention toward processes and strategies that help them acquire

competencies. According to a study by Schunk (1996) students that pursue learning goals are apt to experience an increase in self-efficacy and motivation. Literature (Schunk, 2001; Zimmerman & Kitsantas 1997) supports the notion that the learning orientation and learning goals lead to greater academic achievement and more meaningful learning. For example, on a landscape architecture studio project, learning-oriented goals might include learning how to apply Lawrence Halprin's design process – R.S.V.P. cycles – to a recreation master plan or learning how to integrate the computer program sketch-up into a design project.

By contrast, with a performance orientation, a student focuses on grades, rewards, and approval, while attempting to gain a positive judgment from others (Pintrich & Schrauben, 1992). With a performance orientation, students set goals that reflect a desire to look good and receive favorable judgments from others or not to look bad and receive unfavorable judgments (Dweck & Elliott, 1983). A study by Zimmerman and Kitsantas (1997) showed that students with a performance orientation were more likely to desire external regulation, since it was external approval that they were wanting anyway. In a study by Schunk (1996), students with a learning goal orientation were far more likely to self-regulate than those students with a performance orientation. Schunk says that learning-oriented students are "more likely to seek help to determine the correctness of their work, whereas performance-oriented students will likely seek help to determine how their work is perceived compared to others" (pg. 381). For example, a performance-oriented goal in a studio might include not trying to learn Halprin's process or not trying to learn how to use sketch-up. In this way, students avoid trying to learn additional knowledge through the project since it exposes their possible incompetence.

On a studio project, a student demonstrates a learning orientation when he or she sets goals related to mastering a skill or developing knowledge and understanding. For example, a student with a goal to learn about stream restoration and apply principles related to it towards the solution of their studio project is setting a learning-oriented goal. By contrast, a student demonstrates a performance orientation when he or she sets goals related to their perception of what others think of them or will think of them depending on their engagement with certain tasks. For example, the performance-oriented student might set a goal to learn about stream restoration too, however, his or her goal may actually be set to reflect that which they already know or feel comfortable achieving. In this way, they reduce the risk of looking incompetent. The reason this occurs is that the student with a performance- orientation also lacks self-efficacy. Without self-efficacy, he or she does not believe in their own capabilities to learn the deeper

concepts of stream restoration for example. Self- efficacy is discussed further in the next sub-section.

Self-Efficacy

People are more likely to engage in certain behaviors, like setting and achieving learning-oriented goals, if they believe they are capable of executing those behaviors successfully (Bandura 1977, 1986; Maddux, 1995). An individual's "beliefs about their capabilities to exercise control over events that affect their lives" and "beliefs in their capabilities to mobilize the motivation, cognitive resources, and courses of action needed to exercise control over task demand" (Bandura, 1990, p.316) comprise the concept known as self-efficacy. Self-efficacy is similar to self-esteem and self-confidence, except that self-efficacy is task or problem specific (Ormrod, 1999). For example, a student may have high self-efficacy about learning how to use watercolors but low self-efficacy about making 3-dimensional models. Studies by social learning theorists (Bandura, 1977; Schunk, 1989; Zimmerman, Bandura, & Martinez-Pons, 1992) have shown that self-efficacy affects an individual's behavior in four primary ways: (1) project engagement; (2) motivation; (3) goal setting; and eventually, (4) learning and achievement. It is important to note that self-efficacy plays a significant role in design since the activities and outcomes of design often change while, as Schön would say, in action. This means that since design involves an evolving process with indeterminate variables, a student's self-efficacy beliefs can be challenged, as a result, thus rising and falling as the project progresses.

Project Engagement: People tend to choose tasks and activities at which they believe they can succeed; they also tend to avoid those at which they think they will fail (Pintrich & Schunk, 1996). As discussed earlier, students must actively engage with the studio project in order to optimize PBL and reap its benefits. However, a student must first believe that he or she is capable of executing the project, or in other words have high self-efficacy, in order to actively engage. Furthermore, since the project consists of many different tasks and since self-efficacy is task specific, then a student's degree of self-efficacy is both varying from task to task and cumulative as beliefs combine. In any event, self-efficacy strongly influences project engagement in addition to influencing motivation, goal setting, and achievement.

Motivation: In Bandura's (1986, 1989) view, motivation is a goal-directed behavior activated and sustained by a learner's self-efficacy for executing a task or attaining a goal. As a result, an individual with high self-efficacy sets more task-specific goals, thus increasing his or

her motivation and exertion of effort while attempting to accomplish a task. Another result of increased motivation from goal-setting is that an individual is more likely to persist when he or she encounters obstacles (Bandura, 1986; Locke & Latham, 1990, Zimmerman, Bandura, & Martinez-Pons 1992). In addition to the inherent interest that can come from a real-world problem and the motivation that initially comes from self-efficacy (Zimmerman, 2000; McWhaw & Abrami, 2001), a student working on a studio project must also maintain his or her motivation, effort, and persistence over an extended period of time by increasing SRL and learning-oriented goal setting.

Goal Setting: Goal setting refers to establishing quantitative or qualitative standards of performance (Locke & Latham, 1990). In Bandura's (1986) concept of self-efficacy, goals eventually lead a student to pose reflective questions like: "How Am I doing?" or "Am I good at this?" Bandura says that a student references his or her answers to these questions against established standards (i.e., goals) resulting in both affective reactions such as pride or shame, and cognitive judgments of competency that contribute toward motivation and SRL. A study by Barone, Maddux, & Snyder (1997) confirms Bandura's claim, suggesting that people with higher self-efficacy are more likely to engage in effective self-regulation since they are more likely to set learning-oriented goals. Schunk (1990) suggests that self-efficacy can be enhanced by providing students with goal-based feedback that links their successes with their effort and abilities. In this way, students are then able to learn that their efforts shape their abilities and it is this belief that many researchers hypothesize underlies learning and achievement (Bandura, 1986; Locke & Latham, 1990; Zimmerman, Bandura, & Martinez-Pons 1992).

Learning and Achievement: Student with high self-efficacy tend to learn and achieve more than students with low self-efficacy, even when actual ability levels are the same (Schunk, 1989; Zimmerman, Bandura, & Martinez-Pons, 1992). A study by Schunk (1988) shows that self-efficacy can influence students' choices about approaches to learning new or unfamiliar tasks by increasing or reducing engagement and motivation. Schunk has also shown that a student's perceptions about what led to the success or failure of his or her performance outcomes evidenced during the learning process influences their ability to perform learning tasks regardless of their prior learning level. For example, when a student working on a studio project perceives that their efforts to find project-related resources has contributed to their success, then this belief will increase his or her self-efficacy in terms of finding resources. As a student develops higher self-efficacy toward more and more project-related tasks, the cumulative result

is future increases in overall engagement, motivation, goal setting, and eventually learning and achievement.

Three Sub-Processes in Social Cognitive Learning Theory

Bandura (1986), says that three sub-processes strongly effect social cognitive learning and influence SRL. These three processes include self-observation, self-judgment, and self-reaction. According to Schunk (1996), SRL occurs as these three processes work together to regulate learning: "with goals in mind, students observe, judge, and react to their perceived progress" (p. 354). Schunk contends that these processes are not mutually exclusive but rather interact with one another, strengthening and re-structuring the roles of the student's learning environment, peers, subject, and teacher.

Self-Observation: Self-observation is the deliberate attention or monitoring of various aspects of one's behavior (Schunk 1996). Through self-observation, people assess observed aspects of their behavior against goals, and react positively and negatively. Butler & Winne (1995) argue that a student's monitoring forms the "hub of self-regulated task engagement and the internal feedback it generates is critical in shaping the evolving pattern of a learner's engagement with a task" (pg. 275). A study by (Butler & Winne, 1995) confirms that feedback from self-observation provides information that leads to a learner's conforming, adding, overwriting, tuning, or restructuring of their own learning. In addition, Schunk (1996) says that research supports the benefits of self-observation and monitoring as an effective means to achieving higher academic outcomes and increasing self-regulatory attitudes.

Recent studies suggest that effective self-observation should meet the following criteria: (a) regularity – students should monitor their learning at regular intervals throughout the project; (b) timeliness – students should monitor their learning as close as possible to the setting of a goal or completion of a project-related task; and (c) students responsibility – students should take the responsibility for monitoring their own progress on the project and use the information to self-regulate future thinking and behavior. On studio projects, the studio teacher through a process of desk critiques and pin-ups usually makes a student aware of his or her progress. However, in more advanced studios, when SRL becomes particularly important for success because student have greater project ownership and decision-making opportunities, the student must learn to critique his or her own progress through self-observation in order to effectively execute the

project. Students enhance SRL when they improve their self-observation by developing effective monitoring strategies that are regular, timely, and self-initiated.

Self-Judgment: Self- judgment refers to comparing present performance with one's goals and making a judgment as to one's progress. Self-judgments, especially favorable ones, cause reactions that help sustain motivation on future performances (Schunk, 1994). Recent literature identifies two key variables affecting a student's self-judgment: a) attributions of success and b) goal orientation. An attribution of success refers to the causes a student attributes to their success or lack of success. A study by (Zimmerman & Schunk, 2001) demonstrating how attributions of success influence work habits concluded that almost anything that a student judges to have been the cause of his or her success is likely to reinforce behavior. For example, if the student thinks that their success was a result of staying up all night, then they are likely to continue to pull all-nighters. The second variable, goal orientation, refers to a student's choice or orientation toward a particular type of goal (Zimmerman & Schunk, 2001). As discussed earlier, there are two goal orientations: performance and learning. A study by (Zimmerman & Schunk, 2001) showed that students with learning goals were more likely to engage in self-judgment since these students had a goal directly related to their learning effort upon which to base their judgment. The relationship of self-judgment to design is that as students engage in designing, they must attribute value to their efforts. For design students, this is often difficult since many behaviors that the design student does are unique from project to project. Thus, the student must learn that those behaviors that had value for one site or project might not hold the same value for another.

Self-Reaction: The change in behavior or response a student makes after their self-judgment is their self-reaction. Self-reactions to goal progress motivate self-regulated learning (Bandura, 1986). If a student believes that he or she is accomplishing goals and progressing, then the positive reaction boosts self-efficacy and increases motivation (Schunk, 1996; Bandura, 1986). On a design project, a student may react to an idea that was well developed and critiqued favorably with additional effort aimed at further developing the idea into a viable design. By contrast, a student may react to a poor critique by throwing out the idea and starting over. While a new idea might be what is needed, this student may also be giving up on an idea that just needs some more work. This kind of behavior highlights the complex relationship between the three sub-processes and design learning. The often fuzzy and confusing nature of learning how to design involves trial and error, and even making mistakes, behaviors that in most cases would

negatively influence one's self processes. However, for the design student, it is important to learn that behaviors are just a part of the design process. For some students, this is easier than for others.

The following example shows how self-observation, self-judgment, and self-reaction work together. Imagine a student sets a learning-oriented goal to learn how to create an effective sense of mystery in a garden. In order to achieve his goal, the student contacts and visits gardens, and collects articles about garden design and mystery. He begins taking notes and turning his ideas into sketches. Based on his sketches, he receives feedback from his classmates and professor that he uses to make changes and develop his ideas. As he observes that the idea is beginning to meet his goal, creating a sense of mystery, he judges his behaviors (i.e., sketching, soliciting feedback, visiting gardens) to have been worthwhile and feels that he is becoming more competent in term of his knowledge and ability to engage in garden design. The result is that the student has learned more about how to design and developed a greater likelihood that he will engage in similar behaviors in the future. In this case, the student was actively engaged in a search for answers to a problem that he felt he needed to answer. Through a reciprocal relationship between designing and SRL, this student was learning.

An alternative, contrasting example would begin with a student who has a performance-oriented goal. For example, the student's goal might be to draw a plan that shows the professor that he or she knows how to design a garden. The student begins with a goal, but the goal is related to a process other than that of design. This student's process is about generating a final plan rather than developing an idea. The difference in orientation will influence the student's competency in terms understanding the design process, knowledge of garden design, and even the quality of the final drawings since they are likely to reveal incompetent ideas. In this case, the student will be confused about what types of SRL behaviors to employ relative to the process of design. Instead, the student will use SRL in conjunction with a process of completing a project that pleases the teacher. Thus, this student's learning is not so much a result of a reciprocal relationship between designing and SRL but between finishing and SRL.

Modeling

In social cognitive learning theory, "learning is largely an information processing activity in which information about the structure of learning… is transformed into symbolic representations that serve as guides or models for action" (Bandura, 1986, pg. 51). In other

words, a great deal of learning occurs by people watching other people's behaviors and modeling what they see. Bandura (1977, 1986) adds that even though people can learn by watching others, they might not necessarily imitate the behaviors that they have seen. Bandura (1965) agrees, showing in his study that people can verbally describe a behavior they have observed without actually performing it and people who observe a model's behavior may not demonstrate that behavior until much later when they have a reason to do so. Literature (Zimmerman & Schunk, 2001) suggests that in modeling, learning can occur enactively by doing or vicariously by observing. Within some learning approaches and settings, such as PBL in studios, both vicarious and enactive learning may happen simultaneously.

Enactive Learning: Donald Schön (1987) often refers to enactive learning in his work, "we find people learning to design, perform, and produce by engaging in design, performance, and production. Emphasis is placed on learning by doing" (pg. 16). Schunk (2001) agrees but adds a qualification to Schön's claim, learning by doing or "enactive learning…depends heavily on the consequences of one's actions. Actions that result in successes tend to be retained; while those that lead to failure are discarded." (p. 127). In other words, students are not likely to engage in "design, performance, or production" unless they see that it will result in some rewarding consequence for them. Furthermore, the student must not only see the reward, but must also see himself or herself actually having the capability to attain the reward. In this way, a student may witness a model's behavior lead to a positive consequence, but may not choose to act in the same way because his or her lack of self-efficacy creates a feeling of incapability (Zimmerman, 2001).

The process of learning by doing, or enactive learning, is a basic feature of design learning. Students learn how to do landscape architectural design by engaging in the practice of doing. For students that do not understand the process of design, a lack of success will mostly likely be the result. Thus, in order to reinforce successful behaviors and actions, a student must first understand how to design. Part of understanding how to design is knowing that a designer is often confronted with setbacks and challenges that must be overcome with additional engagement and activity rather than disengagement. When students begin to realize this, they can begin to avoid developing feelings of incapability and replace them with feelings of possibility.

Vicarious Learning: Schunk (2001) says, "Much human learning occurs in the absence of overt behavior, or vicariously by observing others. Vicarious learning accelerates learning and saves us from experiencing many negative consequences" (p. 128). Bandura (1977) agrees,

noting that with vicarious learning, "the capacity to learn by observation enables people to acquire large, integrated patterns of behavior without having to form them gradually by tedious trial and error" (Bandura 1977, pg. 12). According to Bandura (1977, 1986), many behaviors people exhibit have been acquired through observing and modeling what others do. While the benefit of vicarious learning is that it allows students to learn without necessarily "plunging" headlong into a project, which may cost a student time and even damage self-efficacy because it is largely trial-and-error. It does pose the problem of being largely imperceptible. In other words, it is hard for a teacher to tell if a student is paying attention to the model, retaining what he or she saw, replicating the observed behavior accurately or even motivated to model the behavior (Bandura, 1977, 1986).

Assuming that students in studio learn, to some degree, by modeling other student's behaviors, then, it becomes critical that students are made aware of what is and what isn't effective behaviors and who is and who isn't acting effectively. This will help to avoid the phenomenon of students emulating their friends and cohorts rather than another student who success and achievement has shown to be worthy of emulation. By observing a student's behaviors including work patterns (e.g., late night, collaborative, seating arrangement) and interpersonal associations (who a student is closest with is who they will observe the most), studio teachers can begin to discern many aspects related to how a student self-regulates their learning, including who and what they have chosen to model. The results of such observations tend to help a teacher foresee a student's future behavior.

Enactive and vicarious learning take an unusual form in the design studio. This occurs because of the nature of design, and the nature of learning how to design involve an experiential quality that requires a suspension of analytic and rationale thought for periods of time. This means that sometimes learning occurs neither through the doing or watching others do, but simply thinking and reflecting on possibilities. As a result of engaging in the highly personal, creative process associated with designing, the designer often develops highly personal strategies that do not readily lend themselves to modeling. In addition, the activity of doing or engaging in design is also a behavior that is to some degree unique to each designer. Thus, while enactive and vicarious learning are valuable considerations for the design studio, it is important to consider that they occur in an unusual form due to the studio's learning context.

Environmental Management

Environmental management refers to the utilization and management of circumstances and resources external to the self in the pursuit of learning-oriented goals (Zimmerman & Schunk, 2001). It involves knowing where to find assistance, planning and scheduling, and establishing a productive learning environment. Regulating one's physical and social environment occurs out of an attempt by the learner to maximize the likelihood of attaining goals (Zimmerman & Risemberg, 1997). In studio, this might entail going home to work on a project because studio is too noisy or choosing a desk by a student who is not necessarily a friend because that student knows how to use a new computer program. A study by Zimmerman and Martinez-Pons (1986), found that high achievers reported greater use of environmental management techniques than low achieving students and that self-regulated learners tend to restructure their physical environment to meet their learning goals.

Environmental management plays an important role in landscape architecture studios since studios work in close proximity for hours at a time and face the possibility of various distractions. In addition, most studios are available for students to use 24 hours a day. They contain couches and other amenities that make the student feel comfortable. However, these features can present as many challenges as the do opportunities. Thus, the students in studio must actively manage their learning environment and attempt to create advantageous situations, even if it means going home to work. The issue of environmental management is further complicated for design students since the process of design itself, requires intensive management and engagement.

Methodological Approaches for Studying Self-Regulated Learning

Many important studies support the benefits of SRL and have been included throughout this literature review. These studies and others related to SRL can be categorized as such: interviews (Zimmerman & Martinez-Pons, 1986), survey research (Pintrich, Smith, Garcia, & McKeachie, 1991), action research (Hubbard & Simpson, 2003), and observation and discussion (Hadwin, 1996). The most common goals associated with these types of studies are: (1) build and test theory, (2) investigate the viability of teaching students self-regulation strategies, (3) explore one or more SRL variables such as goal setting, metacognition, monitoring, etc., (4)

examine how SRL influences learning within specific contexts, and (5) examine the relationship between SRL and academic achievement.

One SRL study, which falls within the interview category, is particularly relevant to this study since it involves the use of semi-structured interviews and provides a good example of how interviews are used as a research methodology in SRL research. This study, conducted in 1986 by Zimmerman and Martinez-Pons, involved developing and testing an interview instrument intended to assess student use of SRL strategies. Interview questions included: Who do you ask for help? What do you do when you can't find an answer? Why did you do that?. Zimmerman and Martinez-Pons concluded that their interview method, indeed interviewing itself, is as good as standard tests and surveys for showing correlation between a student's self-report of their knowledge and their academic achievement. In fact, "the most impressive evidence of the size of this relationship was the finding that 93% of students could be correctly classified into their appropriate achieving track through knowledge of their self-regulation practices" (p. 625). Zimmerman and Martinez-Pons's study shows that a student's responses to a set of interview questions about their self-regulative activities and tendencies correlate with their achievement. Since, as earlier sections of the literature review have shown that many studies within PBL use interviews as a research method and since many studies within SRL also use interviewing, this study has adopted interviews as its research method.

Zimmerman's Model of Self-Regulated Learning

This section uses Zimmerman's (2000) commonly cited model to further frame the construct of SRL by explaining how SRL processes work together. Zimmerman's model frames and organizes several important components of self-regulation including goals, self-efficacy, motivation, and other key sub-processes (Pintrich, 1995; Zimmerman & Risemberg, 1997). It is important to note that researchers and scholars have developed and use many different models of SRL in their work. This study presents Zimmerman's model because it is often cited as the most reliable; fits within a social cognitive view of SRL; and emphasizes processes rather than components. The literature review along with Zimmerman's model are used to generate an analytic operational framework that will be presented in this chapter's final section.

Social cognitive learning researchers view the structure of self-regulatory processes in terms of cyclical phases (Zimmerman, 2002). Zimmerman (2000) captures this notion in his three-phase SRL model. In his model, the first or "forethought" phase precedes actual

performance and includes behavioral and cognitive processes that set the stage for action. The second or "performance control" phase involves processes that occur during learning and affect motivation and action. During the third or "self-reflection" phase people respond and react to their planning and learning efforts. The next sections discuss the processes associated with each self-regulatory phase.

Forethought Phase

The forethought phase refers to processes and beliefs that occur before efforts to learn. There are two major types of forethought phase processes: task analysis and self-motivation (Zimmerman, 2002). Task analysis involves goal setting and strategic planning. Task analysis also involves intrinsic interest, referring to the students' valuing of the task skill for its own merits and utilizing a learning goal orientation that values the process of learning for its own merits. Self-motivation stems from students beliefs about learning, such as self-efficacy beliefs about having the personal capacity to learn and outcome expectations that refer to the personal consequences of learning (Bandura, 1997). Schunk (1996) says that "Students motivated to attain a goal engage in self-regulatory activities that they believe will help them (e.g., talk to peers, adjust strategies, and organize ideas)" (pg. 375 –383). In turn, self-regulation promotes learning, and the perception of greater competence sustains motivation and self-regulation to attain new goals (Schunk, 1994).

Performance Phase

The performance phase refers to processes that occur during behavioral implementation. The performance phase processes fall into two major classes: self-control and self-observation (Zimmerman, 2002). Self-control refers to the deployment of specific methods or strategies selected during the forethought phase. Key self-control methods are imagery, self-instruction, attention focusing, and task strategies (Zimmerman, 2002). Self-observation refers to self-recording personal events or self-experimentation to find out the cause of these events. Self-monitoring, a covert form of self-observation, refers to one's cognitive tracking of personal functioning. "Self-monitoring is the hub of self regulated task engagement and the internal feedback it generates is critical in shaping the evolving pattern of a learner's engagement with a task" (Butler & Winne, 1995, pg. 275). Bandura (1986) lists two criteria for self-monitoring: 1)

regularity – the behavior or activity is observed on a continual basis, and 2) proximity – the behavior or activity is observed close in time to its occurrence.

In a studio, self-control methods are the catalyst of design in that they underlie idea generation and development. By choosing to work with an idea in his or her mind, a design student is exercising self-control, in the self-regulative sense. The result is a deeper engagement with the idea and its development. However, for the student to engage in these kinds of self-control behaviors, he or she must recognize a need to think more about the idea. The student recognizes this need based on feedback that comes from self-monitoring and self-observation. By using drawings and discussion, the design student generates information about their progress that initiates a self-control behavior such as idea generation or further drawing.

Self-Reflection Phase

The self-reflection phase refers to processes that occur after each learning effort. The two major classes of self-reflection phase processes include: self-judgment and self-reaction (Zimmerman, 2002). One form of self-judgment, self-evaluation, refers to comparisons of self-observed performances against some standard, such as one's prior performance. Another form of self-judgment is causal attribution, which refers to beliefs about the cause of one's errors or successes (Zimmerman, 2002). One form of self-reaction involves feelings of self-satisfaction and positive affect regarding one's performance. Increases in self-satisfaction enhance motivation (Zimmerman, 2002). For example, the process of design is involves creativity and reflects the thoughts and ideas of the designer. When a design is seen as successful, it fills the designer with a sense of satisfaction that is arguable greater than the satisfaction a student feels from getting an A on a test. The reason for this is because of the amount of effort and personality that goes into the designing compared to taking a test. In this way, designing involves self-reaction and self-satisfaction to a greater degree than many other disciplines.

Self-reactions also take the form of adaptive/defensive responses. Defensive responses refer to efforts to protect one's self-image by withdrawing or avoiding opportunities to learn and perform. In this way, defensive responses to self-reactions will manifest in a performance orientation to goal setting. For example, a design student may avoid doing a perspective of a site in order to protect his or her self-image. If another student asks why he or she is not doing the perspective, the student may get defensive. By contrast, an adaptive response refers to adjustments designed to increase the effectiveness of one's method of learning such as discarding

or modifying ineffective learning strategies. In this case, the student may try to find a way to complete the perspective by using a perspective guide (i.e., a tool) or computer generated perspective. These behaviors reflect the student's willingness to adapt his or her techniques in order to ensure performance and gradually improve his or her ability to draw perspectives.

Section Conclusion

Zimmerman (1986) says that understanding students' perceptions of themselves as learners and their use of various processes to regulate their learning are critical factors in analyzing academic achievement. However, since research on SRL in studio settings does not yet exist, it is difficult to convince studio teachers that a better understanding of SRL "…has profound instructional implications for the way in which teachers plan their activities with students and for the manner in which schools are organized" (Zimmerman, 2001, pg. 2). It seems beneficial for studio teachers to understand the role that SRL plays in studios because numerous studies support the notion that students who engage in SRL at high degree levels improve their learning and performance. This means studies, such as this, that examine the validity of the construct of SRL at predicting, intervening, guiding, and assessing teaching and learning in design studios situations is important for improving education.

Another important aspect of this section, regarding SRL, is the implication that a relationship between design learning and SRL is occurring in studios. Design is a multi-dimensional subject that involves learning an evolving process as well as various skills and craft. By contrast, other subjects often involve a form of learning that is more determinate in how knowledge is acquired. A self-regulating approach allows the design student to focus on those dimensions of design (e.g., skills and behaviors) that will help that individual learn the process of design and develop competency. In addition, learning design involves an aspect of non-analytic behavior. In other words, the student is often going somewhere but not sure, in a rational sense, where it is they are going, but nonetheless seems to know when they get there. The journey of learning design in this sense is tacit. In this way, SRL provides an internal framework for the student to use while engaging in both analytic and tacit forms of design learning.

CONCLUSION

This chapter provided a review and analysis of current research and literature in the areas of studio education, problem-based learning, and self-regulated learning in order to develop a theoretical framework for examining how self-regulated learning influences a student's performance and achievement on landscape architecture studio projects. Throughout this chapter, several recurring themes emerged.

First, studios have been evolving from product-oriented, teacher-regulated learning environments into increasingly process-oriented, student or self-regulated places of professional education. Second, the studio's primary pedagogic approach, problem-based learning, is appropriate for fostering the skills, knowledge, and behaviors fundamental to a professional education. However, researchers have shown that in order to maximize the benefits of problem-based learning, students must become self-regulated. Third, self-regulated learning, problem-based learning, and professional education all agree that in terms of the studio project, a student needs to become proactively engaged and have ample ownership and decision-making opportunities. Fourth, the need for self-regulated learning increases in settings like studios, where students must be active and have to make choices for themselves. Finally, self-regulated learning is enhanced, and thus problem-based learning is maximized, when students set learning-oriented goals; develop strong, positive self-efficacy beliefs; practice self-observation, self-monitoring, and self-judgment; model effective behaviors; and effectively manage their learning environment.

Together, the themes listed above support the claim that enhancing self-regulated learning is an essential factor for optimizing problem-based learning in landscape architecture studios and that by learning more about self-regulated learning, studio teachers can gain the knowledge necessary for ensuring that students acquire self-regulated learning behaviors and maximize the benefits of the studio project.

The following chapter, the methodology, describes the research procedures and strategies used in this study. The methodology includes a discussion of the data collection procedures and describes the study's research method, interviewing. The methodology also includes a discussion of the data analysis techniques including content analysis.

<u>**CHAPTER 3 – METHODOLOGY**</u>

The methodology chapter uses four sections to describe the research procedures and strategies used in this study. The first section discusses the rationale and benefits of a qualitative approach to research. The second section describes several key features of the research methodology including data collection, data organization, and the study setting. Section three, provides a description of the research method, interviewing, and a brief justification for each standard interview question. Section four, discusses the study's data analysis techniques such as open-coding.

QUALITATIVE RESEARCH

This study uses a qualitative research approach in order to develop a theoretical framework for exploring, explaining, and characterizing student goal use and self-regulated learning in design studio settings. Merriam (1998) says that, "Often qualitative studies are undertaken because there is a lack of theory, or because existing theory fails to adequately explain a phenomenon. Thus, qualitative researchers build toward theory from observations and intuitive understandings gained in the field" (p. 7). Since the concepts of self-regulated learning and goals have yet to be adequately examined within a design studio setting, it is critical for future studies to first develop a strong theoretical foundation that coalesces "the meanings, concepts, definitions, characterizations… and descriptions of things" (Berg's 2001 p. 3). A qualitative approach is the most effective means to gaining a deeper introductory understanding of the relationships between self-regulated learning and goals, thus offering the greatest opportunity for building a theoretical framework serving to guide investigations into issues such as student learning and achievement in design studio settings.

<u>**Rationale for Using a Qualitative Approach**</u>

Merriam (1998, pp. 6-8) identifies eight typical characteristics of qualitative research that can be used as a rationale for adopting a qualitative approach. Merriam's eight characteristics include:

1) A qualitative approach aids in understanding the meaning people have constructed from their world and their experiences. This includes attempting to learn how people put ideas,

information, skills, and other beliefs together to form concepts and processes. As Merriam (1998) notes, "qualitative research can reveal how the component parts work together to form a whole" (p. 6). Qualitative research is useful for this study in order to understand how the components of self-regulation, such as goals and motivation, work together to influence the learning process.

2) A qualitative approach often focuses on gaining an insider's perspective into phenomena of interest in order to develop deeper understanding. This means attempting to identify study subjects that are intimately familiar with the focus of the research in order to learn the most pertinent information from them rather than relying on preconceived concepts and beliefs generated by the researcher or other outsiders. Since this study focuses on learning and self-regulation, a qualitative approach is essential in understanding the perspectives of the individual learners themselves, in this case the students in design studios.

3) In a qualitative approach, the researcher often becomes the primary instrument for data collection and analysis. This is in contrast to quantitative research were data is often recorded with machines and analyzed in a computer. This aspect of qualitative research is a result of attempting to gain insight into a something that is very difficult to measure with machines, people's feelings and thought. A qualitative approach is useful in this study because the researcher proposes to collect data types that do not easily apply to computer quantification.

4) In a qualitative approach, the researcher often utilizes fieldwork to obtain data. This means that the researcher must go to the subjects and become familiar with them. Qualitative research is useful to this study because developing a greater understanding of learning happens while observing and talking to students and teachers in the places that they engage in education, in this case the design studio.

5) In a qualitative approach, the researcher typically employs an inductive research strategy. This means that rather than finding data to match a preconceived explanation of phenomenon (i.e. an hypothesis), as is the case with deductive research, qualitative or inductive researchers hope to explain a phenomenon according to their data (Goetz & LeCompte, 1984 *see Merriam p.7*). An inductive strategy is appropriate for this research because the study's objective is to find out more about student goal use and self-regulation in order to develop a theoretical model that explains learning and achievement in studios.

6) In a qualitative approach, the researcher uses qualitative data to develop a richly descriptive product. In this way, words and pictures are used in the subject's own language to explain and describe concepts and ideas. Since learning is a process that is often personal and not easily characterized in numbers or simple definitions, attempting to provide rich illustrations obtained from qualitative methods such as interviews is often the most effective approach.

7) A qualitative approach utilizes a study design that is emergent and flexible, responsive to changing conditions of the study in progress. Since this study is exploratory, a qualitative approach allows the researcher to follow promising leads and unexpected digressions that

surface while talking to students. Having the freedom to adapt the study in a reflexive manner can aid in the development of a more complete understanding.

8) A qualitative approach typically uses nonrandom, purposeful, and small samples. Qualitative studies trade precision resulting from researcher bias and random error for greater insight obtained from a closer and more detailed examination of a phenomenon. Qualitative studies exchange the ability to generalize findings from sample to population for a deeper understanding of the subjects themselves. Examining a large sample of all landscape architecture students in the United States (i.e. the population) is not feasible because of the extreme amount of time and depth required for this particular study and their wide geographic distribution. Therefore, a smaller sampling of cases provides the most reasonable opportunity for gathering the types of data and detail necessary for answering the study's questions.

A qualitative approach is particularly valuable in achieving many of the purposes of this study because "qualitative research is designed to inductively build rather than to test concepts, hypotheses, or theories" (Merriam 1998 p. 45). This does not mean that a qualitative study does not utilize existing theory nor does it mean that data collection occurs without an explicit theoretical framework. Actually, qualitative research begins with a theoretical framework and then uses that as a lens to generate further concepts and theories. It is important to note that "qualitative methods can (and should) be extremely systematic and have the ability to be reproduced by subsequent researchers" (Berg 2001 p.7).

INTERVIEWING

The interview is a common research method used in qualitative research. Interviews can be highly structured, as in the case of fixed response questionnaires, or minimally structured, as is the case in the narrative method (Heyink & Tymstra, 1993; Kleinman, 1988). Many researchers have described the benefits of qualitative interviewing in detail. Heyink & Tymstra (1993 p. 295) have offered a concise summary that has been adapted into the following list:

A. The respondents themselves can raise and suggest important research issues in an interview.
B. The interviewer can clarify misunderstandings and probe for deeper meaning.
C. The interviewer can ask, or in a sense test, emerging hypotheses and research questions immediately in an interview without prior planning.
D. The respondent and the interviewer can build "rapport": a relationship based on confidence, security, and mutuality of purpose that can help obtain responses to sensitive questions.
E. The interview is a "wide-band method": many themes can be checked for relevance at short notice.

F. The interview is particularly appropriate for research into feelings, attitudes, intentions, and motivations of behavior.

Along with the benefits of qualitative interviewing there are also some difficulties. First, interviewers must be knowledgeable, skilled, and well prepared before entering the field. Second, the interviewer must be adept at building rapport, an interpersonal skill used to develop trust and reduce reticence. Even with a skilled interviewer, a bond may or may not occur, especially in a short amount of time. Third, the interviewer needs to know how to efficiently process interview data since this can be both laborious and time consuming. Fourth, difficulties associated with data collection and analysis often result in a qualitative study that is less structured and relatively smaller in sample size than quantitative studies. Unstructured and highly unstandardized interviews are unlikely to fulfill positivist criteria for validity and reliability (Heyink & Tymstra, 1993). A fifth problem with interviews occurs when the "cultural bias that both the interviewer and the respondent bring to the interview distorts the data" (Miller, 1991, p. 161). Additional biases arise when the interviewer or observer becomes as much a part of the study as the respondent. Finally, qualitative research studies and interviews are difficult to replicate by other researchers. Behar (1996) says that this is because "conversations and interactions in the field cannot be exactly reproduced" (p.7).

In this study, the benefits of interviewing out-weigh the disadvantages. A primary reason for using interviewing in this study is to allow the researcher to examine phenomenon, in this case the influence of self-regulated learning and goals on student achievement and learning, that is largely unknown. Even with preexisting literature and studies conducted in different settings, the complexity of the phenomenon as it relates to design studios makes it difficult to preconceive subject responses. Thus, an interview provides the needed flexibility to probe ideas that emerge during the interview dialogue in order to understand the phenomenon. Interviewing and probing is also a necessity because the research questions focus on how self-regulated learning and goals influence achievement, questions best answered by talking with students.

The next sections of the methodology explains the study's design including data collection, data analysis procedures, description of the interview instrument, participant selection, field notes, coding, and grounded theory.

RESEARCH DESIGN: DATA COLLECTION AND ANALYSIS PROCEDURES

The diagram shown below depicts the study's overall design including the sequencing between the data collection and data analysis procedures. The following sections describe each step of these procedures in more detail.

New Questions Begin This Study

Problem-Questions

Unresolved Questions Start a New Study

Existing Literature

Analytic Operational Framework

Satisfy Problem and Answer Questions

Develop Interview Guide

Identify and Select Participants

Develop New Framework

Pilot Testing, then, Conduct Interviews

NOTE: The following sections describe each procedural step inside the bold boxes to the left.

Comparative Analysis: Findings to Operational Framework to Literature

Field Notes and Transcriptions

Categorizing and Coding

Legend:

↓ Procedural Direction of Methodology. Flow is mostly straight forward.

Comparison and Synthesis of Data and Emerging Findings. Flow is mostly back and forth or reflexive.

FIGURE 1 - Study Design Diagram: Diagram indicating the Relationship between Data Collection and Data Analysis Procedures.

PARTICIPANT SELECTION

Study participants include twenty-one undergraduate students majoring in landscape architecture at Virginia Polytechnic Institute and State University (Virginia Tech) in Blacksburg, Virginia. Virginia Tech is a comprehensive land-grant university and the landscape architecture program is fully accredited by the Landscape Architecture Accreditation Board (LAAB). These participants were chosen for two primary reasons. First, the students were readily accessible to

the interviewer. Second, and more importantly, the students enrolled in the landscape architecture program at Virginia Tech are typical of students at other programs. In total, there are approximately 4,000 undergraduate students enrolled in about 70 landscape architecture programs around the United States.

It is important to note that the sample size is small for several reasons. First, a small sample size allows for longer, more in-depth interviews. An in-depth interview is necessary because studying concepts like self-regulated learning in design studios involves exploring new questions, something that requires probing, time, and reflection. Second, interviewing a small number of students is more reasonable in terms of logistics and scheduling. Given the expectation that the interviews will last up to an hour and the transcription, coding, and analysis will last a great deal more time, it seems necessary to interview only a small number of individuals.

Participant Selection Criteria

Rather than obtaining a randomly selected sample, the selection of study participants uses a set of specific criteria to identify certain types of students that were most likely to provide information pertinent to answering the research questions. The criterion for identifying and selecting subjects to interview includes the student's academic year in the landscape architecture program and student's achievement level. The next sub-sections explain the rationale for using each selection criterion and its relationship to the research questions.

Criterion One – Academic Year

Academic year is a criterion for selecting subjects to interview because as students matriculate through the program they are given more decision-making opportunities and choices in terms of how to execute their projects. Literature on self-regulated learning suggests that when students are allowed to make choices in their learning then they also need greater self-regulation. This means that students further along in the program are likely to be have more experience self-regulating their learning in studios, making them more informed subjects. In addition, interviewing students from different years provides the opportunity to explore how self-regulation might change or develop over time or within separate groups. Thus, seven students each from the third, fourth, and fifth year participated in the interviews (Figure 2). Students in these three years, the final three years of the program, have more experience within the

landscape architecture program, more choices in their own learning, and are therefore likely to have developed self-regulating behaviors – either effectively or ineffectively.

		ACADEMIC YEAR IN PROGRAM		
		3RD Yr. In Program	4TH Yr. In Program	5TH Yr. In Program
STUDENT LEVEL OF ACHIEVEMENT	High Achiever	Student 31	Student 41	Student 51
	High Achiever	Student 32	Student 42	Student 52
	Avg. Achiever	Student 33	Student 43	Student 53
	Avg. Achiever	Student 34	Student 44	Student 54
	Avg. Achiever	Student 35	Student 45	Student 55
	Low Achiever	Student 36	Student 46	Student 56
	Low Achiever	Student 37	Student 47	Student 57

FIGURE 2 - Participant Selection Criteria: The number listed in each cell is the student's reference number used throughout the rest of the study to identify a respondent's achievement level and academic year. The first numeral in the reference number refers to the student's year in the program (3rd, 4th, or 5th) and the second numeral refers to the student's achievement level (1 and 2 = high achiever, 3, 4, and 5 = average achiever, 6 and 7 = low achiever). For example, 51 refers to a high achiever in the 5th year and 46 refers to a low achiever in the 4th year.

First-year students are not participating because they are taking general university curriculum requirements and do not take studios in landscape architecture. Students in the second year are not participating because they are only in their first landscape architecture studio and are less likely to have learned how to self-regulate their behaviors within studio settings and in terms of design learning. The reason these students are less likely to have learned how to self-regulate is because many of the second year student's projects are externally regulated by the professor. Graduate students are not participating because of the wider range of variables that effect their learning situations. Many graduate students have undergone a different process of professional acculturation than undergraduate students because of their age, experience, and the overall structure of the master's program.

In summary, academic year is a criterion because as students matriculate through the program, their projects gradually shift from being externally regulated by the professor in the first and second years to being self-regulated by the student in the fourth and fifth years. Thus, students further along in the program are more experienced with self-regulating their design projects and are therefore more useful in terms of answering the research questions.

Criterion Two – Achievement Level

Achievement level is a qualitative measurement that combines a student's grade point average with faculty assessments to determine a level of achievement. For each academic year, (i.e., third, fourth, and fifth), two high, three average, and two low achieving students were identified and asked to participate in the study (Figure 2). Study participants fall into three achievement levels that create opportunities for exploring self-regulating behaviors as they relate to degree of achievement.

Achievement level is a criterion for selecting interview participants because it allows the researcher to address the first research question: How do landscape architecture students use goals to self-regulate their learning and achievement in a design studio? in response to existing literature related to achievement and the role of self-regulation. Literature on self-regulation suggests that all students self-regulate their learning, however, key differences influencing self-regulation correspond to a student's achievement level. In this way, high achievers are more adept at self-regulating their learning and thus more likely to encounter meaningful learning.

Limitations Regarding Participant Selection

The decisions mentioned above in term so participant selection have influenced the study by, among other things, defining its scope, facilitating data collection, and contextualizing the data analysis. These decisions have invariably had a limiting effect on the study's findings and their generalization. Two of the most significant limitations arising from the selection of study participants are listed below.

1. Since the participants are from only one university program, it is difficult to generalize the study findings to other landscape architecture programs with certainty. It is possible that the different teaching methods employed by different landscape architecture program will lead students to employ different SRL strategies and behaviors. By not interviewing students from

other programs, any SRL strategies and behaviors that are unique to students at those programs remain undiscovered. Future studies should attempt to interview students from multiple programs in order to increase study reliability and validity while enhancing opportunities for discovering new information about how students' self-regulate their learning.

2. The identification of high and low achieving students by the program's faculty carries with it some biases. One reason that high achieving students engage in SRL might be because faculty at Virginia Tech encourage or value self-regulating behaviors, and thus, it is likely that the students they identified as "high achievers" would exhibit these behaviors. Other methods of identifying high achievers should be utilized in future studies.

CONDUCTING THE INTERVIEWS

The researcher conducted interviews during the Fall Semester 2003 in the landscape architecture studio. The researcher used a semi-structured interview guide (Figure 3) as a basis for asking questions. The interviews were recorded using audio tapes. The next section explains the details of the interviews.

Interview Scheduling and Reminders

After identifying prospective participants (see section above), the researcher approached each student and asked him or her to participate in the study. The researcher described the study to each prospective participant in the following way: "as a part of my Ph.D. program, I am doing interviews with students to find out how they learn in studios. The interview will last between 30 and 45 minutes. Would you be willing to participate?" There were no negative ramifications if a student were to choose not to participate. Prospective participants were told that their identities would remain anonymous if they chose to participate and that the results of the research would be reported in a manner that would not allow someone to deduce their identity. Students were also told that the interview would be audio taped in order to ensure that the discussion was transcribed accurately. Every student that was asked to participate agreed to do so.

The participant's convenience and class schedule dictated the interviewing schedule. The researcher was careful to avoid interviewing students in any set order, such as interviewing all of the low achievers first and together, in order to maintain their anonymity and to protect student identities. The researcher gave each participant a reminder note with the date and time of their

scheduled interview. The interviewing schedule spanned two-weeks during the final third of Fall Semester 2003 (November 25 – December 10). A study assumption was that by conducting the interviews toward the end of the semester, students would draw their answers from reflections on a current and immediate studio project. This is important for ensuring that participant responses are based on relatively fresh studio experiences and not distant memories of such experiences.

Interview Location

Each interview occurred within the studio setting itself. Conducting interviews in the studio provides the opportunity for students to their draw responses from a familiar context. Most interviews occurred in the morning at the student's own desk. However, at times the studio was very noisy and interviewing took place at a quieter desk in the back of the room. Another reason that interviewing happened when the studio was mostly empty was to avoid potentially biasing distractions during the interview and not to influence those study participants who had yet to be interviewed.

Interview Length, Audio Recording, and Field Notes

Interviews lasted between 25 and 45 minutes depending on the follow-up questions and probes. A 3-5 minute break was taken after getting the answers to question 4 and all its follow-up questions. All of the interviews were recorded on both a mini-cassette recorder and a digital recorder to ensure that the interview was captured. As interviews were being conducted, the researcher took field notes. These notes attempt to describe the latent content of the interviews and record any issues that appeared to reemerge in each interview.

Informed Consent, Confidentiality, and Rewards

Before the interview began, each student was asked to read and sign a Human Subjects Informed Consent Form (See Appendix). Each student that participated in the study read and signed this form. The form gave the researcher permission to use the transcriptions of the interview in the study with the understanding that each participant's identity was kept confidential. The researcher guaranteed the student's confidentiality by assigning each student a reference number for use throughout the study (Figure 2). Students were not given any reward for participation nor under the assumption that they would receive any compensation or punishment for not participating.

DEVELOPING THE INTERVIEWING GUIDE

A close examination of the research problem, existing literature, and research questions resulted in the development of an analytic working model (Literature Review). The analytic working model helps frame the collection of data and inform the construction of questions for the interviewing guide. The interviewing guide is semi-standardized which means that it utilizes a common set of questions but ultimately relies upon probing and follow-up questions to explore subject areas and obtain deeper understanding. The next sections further explain the semi-standardized interview guide including the standard interview questions, examples of typical probing questions, and the pilot testing.

Semi-Standardized Interview Guide

Since very little information currently exists about self-regulated learning and goal use within the context of landscape architecture design studios, it is difficult to presume all the pertinent questions to ask and therefore problematic to create a completely standardized interview. Thus, the interviewing instrument is semi-standard, based partly on existing literature and left partly open to find out what the literature was missing. A semi-standardized interview uses an interviewing instrument containing several standard but broad questions related to the research topic to begin a dialogue between interviewer and respondent. In a semi-standard interview, the researcher asks scheduled questions in a systematic and consistent order, but as Berg (2001) explains, "the interviewer is allowed to digress; that is, without leading the subject, the interviewer is expected to probe far beyond the answers to their prepared and standardized questions" (p.71).

Merriam (1998) says, "Usually, some specific information is desired from all the respondents in a semi-standard interview, in which case there is a highly structured section to the interview. But the largest part of the interview is guided by a list of questions or issues to be explored, and neither the exact wording nor the order of the questions is determined ahead of time" (p. 75). For this study, a certain amount of common information regarding self-regulation and goal use needed gathering to allow for comparing student responses. These types of questions form the scheduled interview questions asked of every participant (Figure 4 below). However, as noted previously, researchers know very little about the subject of this study and therefore many unscheduled questions and probing occurred to allow for exploring unforeseen

subject areas. Some necessary re-phrasing of the types of preexisting questions found in the literature was also needed in order to respond to the differences between students in landscape architecture studios and the types of students and learning contexts examined in past studies. Below is the interview guide followed by the rationale underlying each scheduled question.

STUDENT: _____   DATE: _____

How would you describe studio this fall?

What have you been working on in studio this fall?
> *If necessary, narrow to one project by asking which project is most significant and why?*

Let's walk through that project…
> *What type of project is it?*
> *How did it start?*
> *What approach did you take?*
> *How did you proceed? Next…*
> *Did you like it?*
> *What did you learn from it?*
> *How has it challenged you?*
> *What has been the biggest advantage/disadvantage?*
> *What would you change about your project?*

What is it like working in studio?
> *How would you summarize your work in studio this semester?*

What does it mean to be successful in studio?
> *What are the most important factors to your success in studio?*
> *What are the biggest obstacles or hindrances to your success in studios?*

If you were department head, what would you change about studio?
> *What wouldn't you change about studio?*

What is the purpose of studios in LA education?

FIGURE 3 - The Semi-Standardized Interview Guide: Scheduled questions are in boldface type and questions in italics are typical probes that emerged during the interviews and posed on a consistent basis, but were not scheduled. Depending on subject responses, additional questions and probes are used.

<u>**Standard Interview Questions and Probing**</u>

        The following section explains the rationale behind each standard interview question and the types of probes associated with each question. Six scheduled questions derived from existing literature and the research model help guide the interviews. The general purpose of each question is to initiate a dialogue within a particular research area so that the researcher can probe the respondent with follow-up questions to discover deeper meaning. Probing includes a series of follow-up questions that occur after asking each major question. Determining the follow-up questions was a constructive process built within the course of the interview dialogue. The researcher made field notes directly on the interview guide during each interview to help organize and monitor the use of follow-up questions and probing. Thus, the researcher became better at choosing follow-up questions in parallel with becoming more skilled at listening, note-taking, and anticipating responses.

Question 1

        Scheduled Question: How would you describe studio this fall?

        Question 1 elicits a basic characterization of the studio as the student sees it. This is important because it provides contextual information regarding a range of factors that influence self-regulation. In addition, question 1 is useful as an introductory question because it is flexible and non-leading, allowing for a wide-range of ways to begin the interview dialogue and build rapport with subjects. However, the likelihood of numerous different responses, many of which may be unanticipated, does require extra caution, by way of field notes, to carefully and thoroughly follow-up all possible leads.

Question 2

        Scheduled Question: What have you been working on in studio this fall?

        Question 2 provides specificity to the interview questions by focusing on the semester's project. This is important because self-regulation and goal-directed behavior in studios is directly associated with what a student is learning from the project and project-related tasks. In some cases, students would mention several projects that they were working on and the researcher would ask the student to focus on what they were learning in regards to the longer project. The longer project became a focus for facilitating the interview because a longer project provides a

broader range of issues to explore. Most students went into lengthy descriptions of what they were learning and the researcher had to help direct the interview by focusing on the learning associated with the student's semester work. Actually, walking step-by-step with the student through their learning as it related to their semester project was standardized procedure as seen in Question 3 below.

Question 3

    Scheduled Question: Let's walk through that project…
    Typical Probes: What type of project is it?
                             How did it start?
                             What approach did you take?
                             How did you proceed? Next…
                             Did you like it?
                             What did you learn from it?
                             How has it challenged you?
                             What has been the biggest advantage/disadvantage?
                             What would you change about your project?

Question 3 provides a tangible element, the semester project, to the questioning and allows the student to reference their responses to a real project that is familiar to them. In this way, the researcher learns more about self-regulated behavior and goal use embedded in the student's experience rather than their speculation. In addition, connections can be seen between the typical aspects of doing a landscape architecture project and how high or low achieving students behave during those aspects. In other words, Question 3 allows for examining how students from different achievement levels execute a design project, an important aspect of this study that's explained later. Walking through the project with the participants also allows them to retrace their behavior and thinking over the span of the project thus facilitating exploration into the critical self-regulative dimension of time.

Question 4

    Scheduled Question: What is it like working in studio?
    Typical Probes: How would you summarize your work in studio this semester?

The purpose of Question 4 is to begin a discussion about personal feelings that may affect goals and behavior. For example, if students say that they do not like to work in studio and that they usually go home to work on their projects, then follow-ups questions might be used to

investigate why they go home – is it for a positive reason such as a self-regulative strategy to help accomplish a particular goal or is it to avoid receiving criticism from the professor which is probably a negative strategy. In the case of a shy student who goes home because they feel more comfortable there, follow-up questions are used to uncover the ways that self-regulation and goals influence the student's learning while working between two places, home and the studio. In addition, Question 4 facilitates questions about motivation and social interaction within studio, both of which are essential indicators of self-regulation and goal use.

"How would you summarize your work in studio this semester?" is listed as a typical probe here because it was at this point in the interviews where most students began summarizing their semester's work. This most likely happened because of the discussion that occurred during Question 3. If this typical probe was not asked at this time in the interview, it was asked during Question 5 or 6 so that the responses could be compared between participants.

Question 5

Scheduled Question: What does it mean to be successful in studio?
Typical Probes: What are the most important factors to your success in studio?
What are the biggest obstacles or hindrances to your success in studios?

Question 5 verifies that the participant's description of success is consistent with their previous answers and allows for investigating an association between a student's achievement level, behavior, thinking, and their descriptions of success. In this way, the factors influencing success according to high achievers can be combined into a single category for comparison to the low achievers. For example, if 6 participants say that talking with peers about their project is important for success and those same 6 students turn out to be high achievers, then it looks as if talking with peers is probably helpful for high achievement. Theses types of patterns were identified for low achievers but the behavior and factors for success that low achievers depict usually mirrors the negative patterns described in previous studies on self-regulated learning. For example, low achieving respondents will likely describe their goals in terms of negative patterns such as goals that are specific but too easy or goals are too vague (Locke 1991, Locke and Latham 1990).

Question 6

Scheduled Question: If you were department head, what would you change about studio?

Typical Probes: What wouldn't you change about studio?

Question 6 encourages students to envision themselves as a leader with the power to choose and regulate a range of things associated with the studio setting and project. Question 6 was determined from previous studies and literature that suggest increasing students' choices lead to increasing needs for self-regulation. By learning what the student would change or regulate, the researcher is able to begin a dialogue with him/her about his/her values and views regarding what he/she feels is not working in the studio as well as suggesting corrective behavior. The corrective behavior that they suggest easily opens up discussions of the student's own self-regulative behavior. For example, a student might say, "I would make it a rule that people shouldn't talk so loud." In this case, a follow-up question might be, "what do you do when it's loud in studio?" and this will usually results in a discussion of self-regulative behavior. It is hypothesized that the high achieving students will suggest changes that differ from the low achieving students and that those responses can be categorized and related to a theoretical framework.

Similar to question 6, the typical probe "what wouldn't you change about studio," is intended to get the students talking about what they feel is working as it should be in studio. Again, this guides the dialogue towards what the student feels is regulated effectively, in other words, "dealt with," regarding common issues associated with their studio. Follow-up questions might ask the student, why they approve of a particular aspect of studio or how they personally deal with a particular issue. In this way, students suggest what they feel is effective or ineffective self-regulation.

Question 7

Scheduled Question: What is the purpose of studios in LA education?

Typical Probes: Numerous

Question 7 again leads the dialogue from the broad purpose and goals of the studio toward a discussion of the student's own goals in studio. For example, when a student says, "I think studio is about learning skills" then a follow-up question in terms of self-regulation might be, "how do you learn skills" which might in turn lead towards questions of goals. In addition,

by raising the issue of landscape architecture education, the researcher has the option to investigate other educational issues related to self-regulation, goal use, project-based learning, and the design studio that might have not been fully examined earlier.

Pilot Interviews

Six pilot interviews were conducted with graduate and undergraduate landscape architecture students. All students asked to participate in the pilot interviewing are not part of the final sample. The purpose of the pilot interviewing was to uncover ineffective questions such as confusing questions and poorly sequenced questions. In addition, the pilot interviews allowed the interviewer to practice interviewing procedures including probing, note-taking, building rapport, audio recording, and timing. Transcriptions were not made of the pilot interviews.

Findings from the pilot interviews showed that the primary questions sufficiently elicited the necessary initial responses. However, the initial responses were usually short and failed to provide much detail. While this finding was expected, it nonetheless reinforced the role of the follow-up questions and probes. Thus, the most useful aspect of the pilot interviews was the opportunity to improve skills at probing respondents and asking follow-up questions.

DATA ANALYSIS

Interviews were analyzed using Glaser and Strauss' (1967) method of 'grounded theory', also known as 'open-coding'. According to Glaser and Strauss (1967) theories are either deduced from logical assumptions or generated from observations. Grounded theory is a qualitative approach that generates theory from observation. It provides the structure often lacking in other qualitative approaches without sacrificing flexibility or rigor. The resulting theory is an explanation of categories, including related concepts their properties, and the relationships among them. The results lead to an evolutionary body of knowledge that is grounded in data.

In grounded theory, variables are referred to as categories or concepts and the researcher attempts to explain the interrelationships between emergent categories. The development of these categories enables the researcher to reduce data into more manageable amounts, so that patterns can emerge, thus structuring the theory.

The basic procedure used in a grounded theory approach is to read and re-read interview transcripts and field notes, with the purpose of discovering and labeling variables by using a

process called open-coding. The process of open-coding enables a researcher to build theories through "defining concepts and developing categories in terms of their properties and then later linking categories through statements of relationships" (Strauss & Corbin, 1998). According to Strauss and Corbin (1998), grounded theory is appropriate for single case studies and studies with a small number of participants because this form of data analysis offers insight, enhances understanding, and provides a meaningful guide for exploring a new subject. The following sections describe the coding and categorizing of the interview data.

Researcher as Instrument of Analysis

It is important to mention that when analyzing qualitative research, particularly when using open-coding, the researcher him or herself is the primary instrument of analysis. Unlike studies where physical instruments like a thermometer for example are used, in interviews, the researcher performs the function of the instrument, identifying issues and concepts, and measuring their relative value. The benefit of the researcher as an instrument of analysis is that the researcher has the flexibility to modify his or her approach as needed and can detect latent content inherent in the subjects. The drawback of using the researcher as the instrument of analysis is that the researcher often lacks the same precision and objectivity that a physical instrument or test might afford. As the instrument of analysis, the researcher must recognize his or her biases and attempt to mitigate them in order to improve the reliability and validity of the study findings.

Coding

Coding refers to the process of naming or labeling things, categories, and properties (Merriam, 1998). Coding procedures range from systematic and formal to intuitive and informal (Rossman & Rallis, 1998; Seidman, 1998). In grounded theory, coding is often systematic but rather informal, relying on the researcher's ability to detect budding categories. For example, in a grounded theory approach, an equally rigorous examination of each interview for emergent, potentially significant categories occurs; however, a preconceived set of categories is usually not applied.

This study adopts a modified version of the coding process referenced above, derived namely from the work of Strauss and Corbin (1998) and Silverman (1991). The next sections describe basic three steps in data analysis for grounded theory: open coding, axial coding, and

selective coding. Figure 4 graphically depicts the relationship between each step in the coding process.
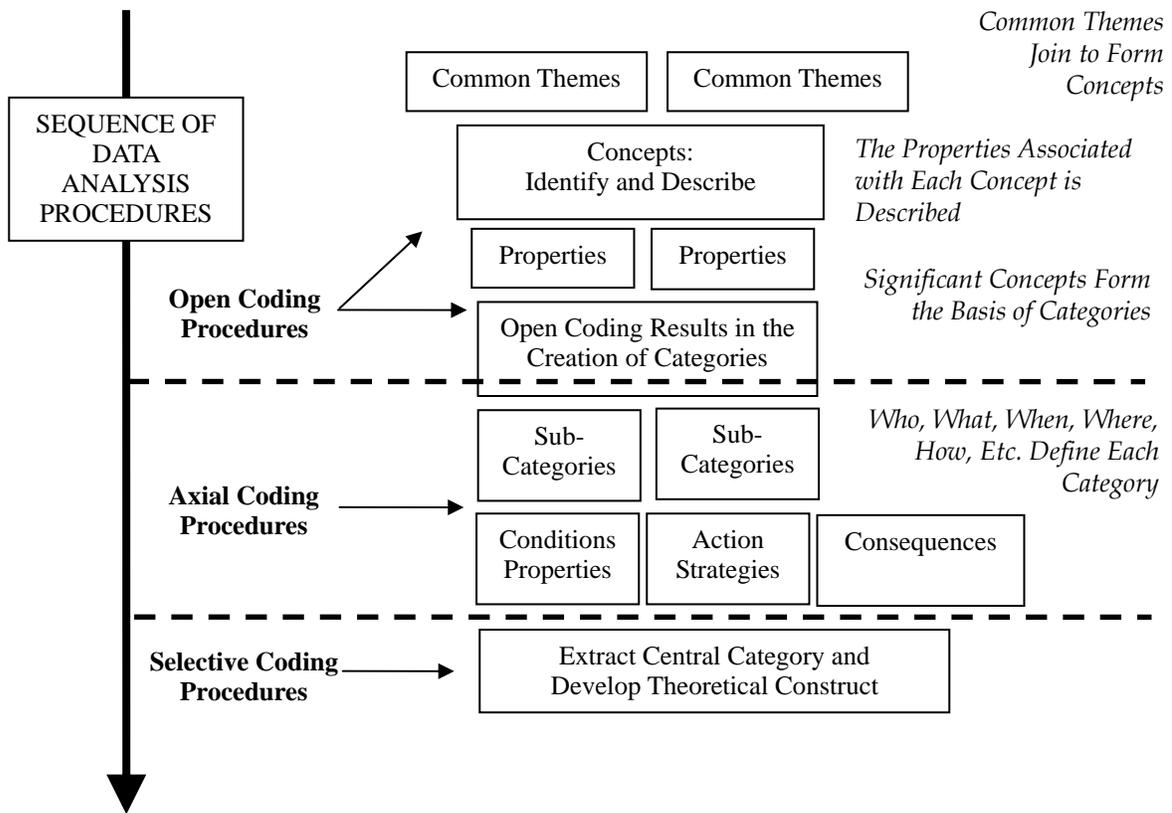
FIGURE 4 - Data Analysis Sequencing and Procedures: The process of data analysis used to identify different categories and concepts during the interviews are interrelated – together forming a theory.

Open Coding

Open coding is the part of the analysis concerned with identifying, naming, categorizing and describing phenomena found in the text. According to Strauss and Corbin (1998), open coding is the "analytic process through which concepts are identified and their properties and dimensions are discovered in data" (pg. 101). The researcher reads each line, sentence, and paragraph in search of the answer to the repeated questions: "what is this about?" and "what is being referenced here?" (Silverman, 1991).

The first step in open coding is to identify concepts. Identifying concepts means to attribute labels to the interview data by distinguishing common properties. For example, in this study one concept that emerged immediately was that of "motivation." The concept of motivation incorporates many similar properties of motivation including self-driven, planning,

passion, relevance, and ownership (Figure 5). By identifying related properties in the interviews and combining them, a concept emerges.

MOTIVATION (Concept)		
Self Driven (51:p.1) Motivation (51:p.4) Meaning and Motive (51:p.5) Passion and Motive (51:p.5) Meaning effects Time and Motive (51:p.5) Process – Motives and Rate (51:p.9) Her Ultimate Goal (51:p.9) Freedom = Motivation (51:p.11) Relevance = Motivation (52:p.4) Self-Interest (52:p.4) Relevance = Motivation (52:p.4) Relevance = Inspiration (52:p.4)	Relevance/Interest and Motivation (52:p.12) Motivation and Relevance (53:p.2) Motivations and Projects (53:p.3) Altruistic Motives (53:p.3) Motivation and Relevance (53:p.5) Motivation and Relevance (53:p.6) Motivation (54:p.1) Consequences (54:p.1) Motivation and Momentum (54:p.2) Inspiration and Concept (54:p.10) Motivation (56:p.3) Low Self-Efficacy (56:p.4)	Feedback – negative (56:p.4) Motivation (56:p.4) Motivation and Relevant Projects (56:p.13) Motivation (57:p.2) Motivation (57:p.3) Motive and Relevance Low (57:p.3) Design and Relevance (57:p.5) Motive and Relevance (57:p.7) Project ownership (57:p.7) Motivation (57:p.12) Motivation and Interest (57:p.13) Peer Int. and Motivation (57:p.13)

FIGURE 5 - **Example of Open-coding**: The concept in this example, MOTIVATION, is at the top of the list followed by related properties. Reference codes like (51:p.4) for example, refer to the student program year (5th), achievement level (1=high) and the transcription page (p.4).

After identifying, describing, and organizing multiple concepts, the next step is to create sets of categories. A category shows how concepts are interrelated by tying together several concepts to provide a stronger organization for presenting research findings. Essentially, categories consist of related concepts that combine to create a larger framework. For example, during this step of coding it became clear that what the students were talking about in terms of concepts such as motivation (shown above), inspiration, ownership, and other concepts should be combined into a single category called GOALS. This conclusion was based on an application of the literature on goals to what was found in the interview data. After reviewing the literature and reexamining how the concepts (and their properties) seemed to fit together it became clear to the researcher that indeed these elements all fit within a single category (Figure 6). Thus, the researcher created a single GOALS category that includes all of the concepts and their properties relating to the goal category. Finally, a single word processing file organizes and stores all the information pertaining to the goals category for future analysis.

GOALS (Category)	
Motivation	Ownership
Goals	Consequences/Responsibility
Inspiration	Initiative
Relevance/Interest/Real World	Effort/Success
Challenge	Expectation

FIGURE 6 - Example of Category Formulation: The concepts of motivation, goals, inspiration, relevance, ownership, initiative, effort, success, and expectations combine to from a single category called GOALS. Categories are derived from interview excerpts pertaining to each concept and describe the properties and characteristics of the category entitled GOALS.

The process of open-coding provides a good example of how theory guided the understanding of the phenomenon under study without necessarily directing it. For example, most theories of self-regulated learning discuss goals but do not always identify goals as a discrete category unto itself. If this study used preexisting categories found in the literature as a starting point to extract the categories from the interview data, then many significant concepts, like goals, would have likely been overlooked. By comparing categories to the analytic operational framework after their identification, the researcher avoids creating categories that are overly biased by the operational framework but instead informs the framework's transformation. As a result, many researchers using an open-coding process must construct new theories to explain categories and concepts that were identified in the data but lack adequate explanation by prior theories.

Axial Coding

Axial coding refers to the formation of sub-categories from the categories developed during open-coding and then relating the properties of sub-categories to each other, via a combination of inductive and deductive thinking. Rather than providing a general explanation for a phenomenon, sub-categories attempt to answer more specific, basic questions about that phenomenon such as what, where, when, and how. The purpose of the sub-categories is to create a dense explanation of the relationships of data components around the "axis" of a category. Strauss and Corbin (1998) emphasize that during axial coding an organizational scheme should develop.

To simplify this process, rather than look for all kinds of relationships, grounded theorists emphasize causal relationships, and fit things into a basic frame of generic relationships. The frame consists of the following items (Strauss and Corbin, 1998):

ITEM	DESCRIPTION
Concept or Phenomenon	In grounded theory it is sometimes the outcome of interest, or it can be the subject.
Conditions and Properties	A set of events or elements and their properties that cause or effect the phenomenon.
Action strategies	The purposeful activities that agents perform in response to the phenomenon and intervening conditions.
Consequences	These are the consequences of the action strategies, intended and unintended.

FIGURE 7 - Terms Used to Explain a Category. As the researcher explains each item, a greater understanding of the category develops.

Each item in the chart helps to further explain and describe a category. Together, they begin to tell a story. But, how are these element taken from the interviews themselves? The following example, taken from an actual interview transcript, shows how axial coding helps identify properties inherent in each category and subcategory. At the time that the coding was done, the concept of "goal planning" had already been determined to be a part of the category "goals". Later, the properties relating to the concept of goal planning are compared to those of other concepts to help explain behavior.

> "Well I guess I'm not really sure of what success in studio is. I mean, I think you go through periods of feeling successful and other times feeling very unsuccessful. And, I ah, you know, many times personally thought: what do I need to do here to be successful. Over the summer I came up with some, like, bullet points about things I felt like I needed to do. And, I was like what is the objective here and what am I trying to do and how can I do this well" (41, p. 14).

One concept that the student talks about here is goal planning. The concept of goal planning is part of the larger category, goals. This is because implied in the text is that the student views goal planning as having certain properties, one of which is success. Goal planning varies from a diagnosis: "what do I need to do," to strategizing: "how can I do this well". The

student's degree of goal planning can lead to consequences: feelings of successfulness or unsuccessfulness. In order to decrease feelings of unsuccessfulness, the student writes down some goals and objectives for the school year, essentially goal planning. One agent of writing down goals is goal description. A goal has certain characteristics such as who sets goals (origin), what type of goal (orientation), how to accomplish the goal (planning), and what is the purpose of the goal (motivation).

Selective Coding

Selective coding is the process of taking the categories and their respective subcategories developed through open and axial coding, refining and integrating them to create a single theoretical framework. The initial step in creating the theoretical framework is to select a central category. The theoretical framework that emerged in this study consists of a central or core category consisting of achievement tendencies associated with a student's goal use, understanding of design, and self-regulated learning in design studios. Together, these tendencies help explain the theoretical framework. In grounded theory, there is a belief that such a central category always exists (Strauss & Corbin, 1998). Once selected, the core category becomes the primary character in the development of a single storyline around which all other categories, concepts, and themes are organized. Selecting an appealing, dynamic central character is very important for grounded theorists since the process of building theory parallels that for writing a story. Thus, selective coding is really about finding the driver that impels the story forward. Achievement tendencies are the driver for explaining this study's findings.

The selective coding process included:

↓ Determining a logical flow (i.e. connection between items, see Figure 4) between categories and subcategories.
↓ Developing the properties and dimensions of each category and subcategory.
↓ Trimming excess ideas that do not fit well within the core category or theoretical framework.
↓ Reviewing each interview to see how it relates to the core category and adds to emergent patterns.

The process was accomplished largely by re-reading the interview transcripts and through the writing process itself. Writing was ongoing and categories were constantly compared to one another and eventually against the basic concepts of self-regulated learning and goal use. After

reviewing the interviews was complete, each student was re-analyzed to ensure his or her fit with the theoretical scheme.

Final Organization

Following the construction of a central category from the coding process is a story explaining the details and interrelationships between the categories, concepts, and other functions of the data. This story uses the analysis and interpretation of data to answer the research questions and meet the study objectives. The result of the story is a new theoretical framework for understanding how self-regulated learning and goals influence student learning and achievement in landscape architecture design studios.

CONCLUSION

This study uses interviews to collect data from landscape architecture students in order to find out how these students use goals to self-regulate their learning and achievement in studios. Finding out how students self-regulate and use goals is difficult without actually asking the students themselves. Thus, since interviewing allows the researcher direct interaction with the students, it is the preferred method of data collection for this study. In addition, since self-regulation and goal use in studio settings has not been examined prior to this study, it is especially important to interview students because of the opportunities for probing and exploration that only interviewing provides.

The interview data was analyzed using Glaser and Strauss' (1967) method of 'grounded theory', also known as 'open-coding.' This method is particularly appropriate for studies with a small number of participants because this form of data analysis offers insight, enhances understanding, and provides a meaningful guide for explaining a new subject. In addition, open-coding results in a core category that can be used to effectively explain study findings in such a way that it helps to build a new theoretical framework. The core category identified for this study is the relationship between design learning and SRL, a category that ties together goals, motivation, studio interaction, and other concepts to explain self-regulated learning and achievement in studios. The following chapters use the concept of a relationship between design learning and SRL and the central category of achievement tendencies to tell the story of student self-regulated learning, goals, and achievement in landscape architecture design studios.

CHAPTER 4 – RESULTS AND DISCUSSION

This chapter presents the results of analyzing the interviews. The first section presents general observations about the study participants. The second section presents study findings related to self-regulated learning (SRL) in landscape architecture studios and the academic year of student participants. The third section discusses study findings relating to SRL and student achievement levels. The chapter concludes with a summary of these findings.

INTERVIEW ANALYSIS SUMMARY

The interview data was analyzed using a version of Glaser and Strauss (1967) open coding technique (see Chapter 3 – Methodology). The basic procedure used in open coding involves the researcher reading and re-reading interview transcripts in order to identify and label emergent, distinguishing features (e.g., SRL behaviors, strategies, project-related factors). Then, the researcher combines those features with strong commonalities into a single theme. Upon identifying a theme, the researcher gives it a label or name that is representative of its common features. Finally, the researcher examines relationships within themes and between the themes and the study variables in order to generate a set of findings. In this study, the themes are actually issues related to the landscape architecture studio and the two primary study variables are academic year and achievement level. The next section provides general observations about the study participants.

GENERAL OBSERVATIONS ASSOCIATED WITH STUDY PARTICIPANTS

Interview analysis began with a general examination of the interviews in terms of SRL in studio. Interviews indicate that students in landscape architecture engage in a wide variety of self-regulative behaviors, strategies, and activities associated with the studio project (Figure 8).

SRL ACTIVITIES, BEHAVIORS, AND STRATEGIES ASSOCIATED WITH LANDSCAPE ARCHITECTURE STUDENTS
Specific SRL Activities, Behaviors, and Strategies
° Take the initiative to come to studio. ° Use professor and other students as sources of knowledge and feedback. ° Create meaningful relationships with other students for the purposes of influencing learning. ° Seek to improve his or her learning based upon deliberate interactions from advanced students. ° Examine needs and seeks help from those who are most experienced. ° Addresses the professor's most salient concerns but maintains ownership for their work. ° Generates multiple ideas and develops them by eagerly talking with classmates and other people. ° Sets limits on the project and him or herself in order to make the project more manageable. ° Uses what he or she learned from past projects as a foundation and guide for their current project. ° Attempt to integrate freedom and personal choice into the project in order to enhance motivation. ° Want responsibility and resists excessive direction that limits the student's ownership for the work. ° Researches in a deliberate and self-motivated way in order to find information that is relative to their project. ° Break their projects down into smaller, manageable pieces using goals based upon emerging needs. ° Puts in additional time throughout the project as needed in order to improve the quality of their work. ° Uses past experiences as a basis for how they organize and plan a project. ° Recognizes possible conflicts between non-studio work and studio, thus puts a priority on getting an early start. ° Generates multiple ideas and monitors their progress based on feedback from varied sources. ° Use their drawings and discussions as a basis for judging their progress from a variety of viewpoints. ° Choose to develop his or her knowledge of process by experimenting. ° Use a methodical approach to designing with specific steps and criteria that help ensure an appropriate design. ° Show a willingness to learn and grow by trying new things. ° Set goals for themselves that addresses the project and the design while building learning competencies. ° Changes his or her goals based upon the evolution of the project and the feedback that they receive from others. ° Goal is to demonstrate their learning and knowledge through drawings and presentation.

Figure 8 - Range of SRL Activities, Behaviors, and Strategies Used by Landscape Architecture Students: specific SRL activities, behaviors, and strategies used by landscape architecture students to address design-related and environmental-related factors during design learning.

The degree of self-regulation associated with these behaviors and activities shown in Figure 8 varies based on the amount of choice students have in their own learning and what they choose to do with it. Therefore, to be self-regulative, behaviors and activities should involve a high degree of self-generated thinking and behavior mostly regulated by the student, rather than externally generated activities and behaviors mostly regulated by the professor.

Study findings suggest that students engage in activities and behaviors that are both self-generated and professor-generated. For example, the students below do not necessarily choose

for themselves to practice their graphic skills but do so as a result of the professor's strong encouragement and close guidance.

> "…its been very important, our rendering. I think that's going to be a big part of this project, for me at least. Because he [the professor] has been on our cases this semester (laugh) about rendering. He's brought in all kinds of art supplies and books for us to, you know, get used to. So that's one of the goals for me, personally in this project, to have really nice drawings, nice final project." (3:1, p.5)
> *Interviewer: And why are those your goals?*
> "Because he's been on all of our cases about it all semester, about improving our quality of drawing." (3:1, p.5)

> "He stresses graphics and presentation a lot more. And umm like he'll go over different techniques and like, one studio was just all watercolors and… different ways to render and he'll give us a lot of different types of books to read. Or he will give us topics to research. Like one night he sent us home researching how to just, different kinds of rendering techniques. And he'll like show us, he'll get books and he'll show us different examples of housing projects, so that we'll see… I mean, he doesn't tell us one specific way of how to do things, but he'll give us all this options of how its been done. And you can kinda pull your own ideas from that. And umm, he just, every class he gives you a new idea to think about." (3:3, p.4)

While these students are being required by the professor to practice and learn more about the subject of graphics they also have some choices. The basic choice is to do what the professor is telling them to do. Other choices include the amount of effort to exert, depth of researching, application to the current project and other choices. This means that even though the students are given overt guidance and instruction, they must still engage in self-regulation to some degree in order to optimize their learning. Nonetheless, the degree of SRL required is lower based upon the professor's involvement.

The student in the next example, unlike the two students previously cited, chooses for him or herself to research and learn more about graphics. The reason why this student chooses to engage is explained below.

> "… the department doesn't have any graphics courses and I don't think, you know, I'm the best artist. I think I can do pretty well. But I have a lot of books that I do exercises out of for practice. And it's kind of like an extra little challenge for me to always be improving and never settle for what I always have." (3:1, p.5)

For this student, the choice to practice and learn more about graphics is their own. It comes not from the professor but from a self-realization that they need to improve their own skills. In this way, the degree of SRL that this student requires is higher than for the previous students.

Professor involvement is the primary factor influencing the need for more or less self-regulation. However, once the need is there, it is up to the student to choose to engage in self-regulation. Moreover, the student must choose a specific form of SRL to employ. This means that students must first become aware that there is an opportunity or need to self-regulate and then choose, based on their prior knowledge, those SRL activities and behaviors, that they think will effectively address their needs. Since the needs that initiate self-regulation in studio, whether generated by the professor or student, are a function of the larger need to learn how to design, students must understand the process of designing in order to recognize the salient issues they must address. In this way, the student or professor initiates SRL in an effort to address a need relative to the process of design.

Learning how to design is the primary issue for landscape architecture students to learn in studio. In fact, learning how to design is the basic function of the studio and design project. Once a student learns how to design, he or she can then begin to use the design project as a vehicle for exploring issues related to designing such as integrating styles and using mixed media. In this sense, learning is design and design is learning. However, learning how to design within a studio setting is not a simple and straightforward process. Studio projects involve addressing complexity, problem solving, creativity, and other factors related to design. In addition, students must realize that design is an ongoing process in which they, as designers, play an active role in how ideas evolve. Self-regulated learning activities and behaviors that are initiated through the process of design learning or through what might be called internal factors (since they are mostly self-generated), are one of two types of SRL observed in the studio. The other type of SRL is initiated in response to the learning environment or what might be called external factors. Figure 9 summarizes the three key design-related or internal factors associated with SRL in landscape architecture studios that were identified during interview analysis.

SRL AS A FUNCTION OF DESIGNING – "INTERNAL FACTORS"	
SRL ROLE IN DESIGNING	**INTERVIEW EXCERPT AND ANALYSIS**
Identification of Goals and Requirements	I drew everything together in one drawing. I traced it and I laid it over and I drew it again. I looked at it to see, umm… like I would look at the road pattern. To see if that… there was access to all parts of the site and the same with the pedestrian patterns. And to see if the pedestrian pattern WAS the dominant way to get throughout the site. And I just kind of listed requirements that I thought I need to have. And I made a checklist to see if that was really what I did. And then I went back and fixed things that I thought didn't fit with my list of requirements. (3:3, p.6)
Analysis	*SRL occurs as student makes a series of drawings aimed at improving his or her understanding of the site and informing an appropriate design solution. The result is a checklist containing a set of goals and requirement from which an appropriate design should come. Since the professor is not explicitly requiring this student to engage in this particular process of drawing and re-drawing and telling him or her which requirements to extract from this process, the student is self-regulating these behaviors in an effort to improve his or her design and learning.*
Idea Generation and Initiation of Feedback	I think you have ideas in your head, no matter if it's right or wrong, this is the way you like it, but you always start asking other people: so what do you think? I mean, is this the idea? Like, you ask the classmate, can you get this out of this? Are you pulling this out? Or, am I the only one that sees this sort of idea? (4:3, p.11)
Analysis	*SRL occurs as the student attempts to generate and hone his or her ideas for the project. Since the student recognizes that some ideas are better than others are, he or she seeks feedback from other students in order to improve the idea. These behaviors are not explicitly required by the professor but are essential to designing, thus the student is engaging in self-regulative activity in order to improve his or her design and learning.*
Process Engagement and Evolution	*INT: Did your goals ever change throughout your project?* Yep. (4:3, p.6) *INT: What changed them?* Um, just like when you are on a site you start to see more than what was there to begin with so, before you thought well this is a broad idea and then you get down to the nitty gritty and you are like, well this is going to have to change because you find something more, you know. (4:3, p.6)
Analysis	*SRL occurs as the student chooses for him or herself that changes are needed as a result of analyzing the site. Since the student is not being explicitly told how to "see" the site, or make and subsequent project-related changes, the student is doing it for him or herself as a self-regulative process aimed at improving their learning and project performance.*

Figure 9 - Design-Related or Internal Factors Influencing SRL: SRL activities and behaviors that students engage in as a function of the design-related factors influencing design learning.

The reason students engage in the SRL behaviors shown in Figure 9 is because the nature of designing involves activities such as goal setting, monitoring progress, and modifying ideas based on feedback, types of activities that are optimized by self-regulated learning. Since the studio professor generally serves as a facilitator in the student's own goal setting, monitoring, and other design activities, the student must recognize the value of self-regulation and choose self-regulated activities that are productive.

Apart from issues directly associated with designing, students must address issues and external factors associated with the project such as the studio environment and other aspects of

college life in order to optimize their learning. This means they must learn to deal with distractions, other course requirements, and various other environmental factors in order to find the time and willingness to put effort into their studio project. Addressing non-design environmental factors or external factors also requires self-regulated learning in terms of time management, allocation of resources, and overall management of the learning environment to ensure success. Figure 10 shows how SRL helps students address three key issues not directly related to designing.

SRL AS A FUNCTION OF THE STUDIO ENVIRONMENT – "EXTERNAL FACTORS"	
SRL ROLE IN MANAGING ENVIRONMENT	**INTERVIEW EXCERPT AND ANALYSIS**
Distractions in Studio	… actually I worked at home this semester. (5:7, p.8) *INT: Why did you work at home this semester?* Too many distractions. (5:7, p.9) *INT: What kind of distractions?* Friends. (5:7, p.9) …Because I would rather talk to them and do stuff with them and listen to music, whatever, then do a project. (5:7, p.9)
Analysis	***SRL occurs as the student chooses to work from home in order to avoid distractions in studio. Since the student is not being told to go home and work, the student is self-regulating their learning environment. In order to do this, the student must have an awareness or familiarity with this SRL behavior.***
Time Management Relative to Other Courses	Any time you have a technology course, I think your studio is going to suffer a little bit because… (Laugh) because you got to spend a lot of time doing these other projects. And, I think it can take a toll on other work and I think for me personally it has taken a toll on my studio work this semester. (3:1, p.1)
Analysis	***SRL occurs as the need to address the issue of course load demands require time management. Since the student is not being told how to manage their time relative to their other courses, they will need to SRL.***
Choices about Where to Work	I don't like to bring my work home too much. Cause when I get home its just kinda like a place to unwind and not think about it anymore. That's why I brought my computer in here and that why, you know, I'm just trying to keep the two spaces more separated. (5:3, p.9)
Analysis	***SRL occurs as the student chooses to separate the work they do at home with the work they do in studio. This is self-regulating since it is not being controlled or required by the professor. In order to engage in this behavior, the student must recognize a benefit of separating these two issues.***

Figure 10 - Environmental or External Factors Influencing SRL: SRL activities and behaviors that students engage in as a function of the environmental factors influencing design learning, but are not part of the design.

Figure 10 suggests that while SRL most often occurs as part of designing, it is not exclusive to it. Since design students must deal with a different set of issues and responsibilities

apart from studio, findings from Figure 10 suggest that SRL can enable these students to address effectively their non-design issues. In order to do this, the student must have an awareness of possible SRL strategies appropriate for addressing non-studio issues. In this way, a relationship forms between self-regulation, the process of design, and the need to manage what is happening apart from studio.

It is important to note that it would be difficult to provide an all-inclusive list of SRL activities and behaviors associated with either internal or external factors identified during interview analysis since this list would be too long. Instead, the activities shown thus far represent the range of different types of SRL that were identified as they relate to the design project and studio. However, close examination shows that the range of SRL activities can be grouped together based on how they relate to different aspects of design and the studio project. For example, two SRL activities derived from the interviews and related to the part of designing that involves researching information and precedent include:

A. The student researches in a deliberate and self-motivated way in order to find for him or herself information that is relative to their project.

B. The student's research is ongoing and used to inform his or her design in specific ways as it evolves.

The common feature of these two SRL activities is researching. Therefore, they can be grouped into a category called researching. In this way, study findings in terms of SRL activities and behaviors form a "self-regulation framework" for design learning within a studio setting. Figure 11 shows the categories that were created by identifying commonalities among the SRL activities and behaviors extracted from the interviews. An exemplar is provided to illustrate the activity related to each category.

SRL ACTIVITIES AND CATEGORIES ASSOCIATED WITH STUDIO PROJECTS AND THE PROCESS OF DESIGNING	
Exemplar SRL Activity, Behavior, or Strategy	**Category**
Generates multiple ideas and develops them by eagerly talking with classmates and other people.	*Idea Generation and Development*
Generates multiple ideas and monitors their progress based on feedback from varied sources.	*Monitoring Techniques*
Researches in a deliberate and self-motivated way in order to find for themselves information that is relative to their project.	*Project-related Research*
Uses what he or she learned from past projects as a foundation and guide for their current project.	*Using Past Experiences*
Uses a methodical approach to designing with specific steps and criteria that help ensure an appropriate design.	*Design Criteria and Methods*
Changes his or her goals based upon the evolution of the project and the feedback that they receive from others.	*Goal Setting and Modification*
Attempts to integrate freedom and personal choice into the project in order to enhance motivation.	*Enhancing Motivation*
Uses past experiences as a basis for how they organize and plan a project.	*Planning and Time Management*
Deliberate about who they interact with in order to seek the type of feedback that lets them know if they are progressing towards their goals.	*Student Interaction with Other Students*
Views the professor as a partner and additional source of knowledge and feedback with whom they share their ideas and goals.	*Student Interaction with the Professor*
Recognizes possible conflicts between non-studio work and the complexity of the studio project and thus puts a priority on getting an early start on the project.	*Managing Studio and Non-Studio*
Despite distractions, values studio as a source for receiving feedback that facilitates learning.	*Learning within Studio Setting*

Figure 11 - SRL Activities and Categories Associated With Design: Shows students engaging in SRL activities as a function of designing.

The categories shown in Figure 11 are representative of the different aspects of design as it occurs in landscape architecture studios. This means that things like researching, goal setting, monitoring, and other activities associated with designing in studio can be used as a structure for understanding the range of self-regulating activities and behaviors students employ. These categories form a basis for further analysis in the following sections.

This section has shown that landscape architecture students engage in a wide variety of SRL activities and behaviors. Students engage in SRL in response to a set of issues that they feel they must address in regards to their design project. As a result, students engage in two basic types of SRL associated with the design project. The two types of SRL found in studio are

design-related or internal and environment-related or external. The degree and manner in which students engage in SRL in response to these factors is based upon their understanding of how to design and awareness of potentially useful SRL strategies. As students learn more about designing, they uncover new issues that require additional SRL to address. In turn, as students engage in SRL, they become better at designing and thus can explore additional design issues. In this way, SRL and design have a reciprocal relationship. Designing requires addressing the issue of SRL and in turn, SRL helps address issues related to designing.

The next section presents findings related to SRL and the student's academic year in the program. Study findings presented in the next section examine the relationship between SRL and design learning as a student progresses through the design curriculum.

STUDY FINDINGS ASSOCIATED WITH ACADEMIC YEAR IN PROGRAM

This section examines the interviews in terms of how students in different academic years (third, fourth, and fifth years) within the landscape architecture program conceptualize various issues related to the studio and how these issues influenced their SRL. The section begins with common findings relative to students in all three of the academic years studied. Then, findings related to third year students are presented. Next, findings related to the fourth year students are presented, followed by findings associated with fifth year students. Finally, the section concludes with a summary of study findings associated with academic year in the landscape architecture program.

<u>Issues among Academic Years</u>

The interviews indicate that students in different years share many of the same issues. Figure 12 shows the full range of issues and topics students emphasized during the interviews.

FULL RANGE OF ISSUES IDENTIFIED AMONG ALL PARTICIPANTS		
(in no particular order)		
° Idea & Concept Generation ° Studio Environment ° Researching ° Time & Time Mgmt. ° Peer Interaction ° Influence of Outside Classes ° Problem Solving Techniques ° Authentic or Real-World Problems ° Working from Home ° Relevance, Motivation, & Ownership	° Reflection & Thinking ° Getting Stuck & Unstuck ° Representation & Presentation ° Decision Making & Fitness ° Resource Availability ° Self Sub-Processes ° Design Processes ° Success in Studio ° Self Sub-Processes ° Professor Interaction ° Goals	° Desk Critiques & Feedback ° Grades ° Modeling ° Project Planning ° Prior Learning & Experience ° Strategy Use ° Precedent Use ° Help Seeking ° Computer Use ° Non-Human Resources incl. Library ° Practicing Skills

Figure 12 - Full Range of Issues Among All Participants: A list of all the issues and topics that students emphasized during the interviews.

The value of Figure 12 is that is indicates the context in which design learning and SRL occurs. However, the important thing to note is not the range of issues but the fact that, based on their year in the program, students tended to emphasize some issues more than others. This is important since it indicates more specifically the kinds of issues that each year is dealing with while highlighting the areas in which students in each year are likely to engage in SRL. Figure 13, indicates that while students in each year emphasized the studio environment, peer interaction, and professor interaction, many other issues were only emphasized by students in one or two of the years. The issues presented in the following figures represent those issues that were most frequently noted during interview analysis.

COMPARISON OF ISSUES AMONG ACADEMIC YEARS		
(issues numbered from most to least noted)		
Third Year Students	**Fourth Year Students**	**Fifth Year Students**
1) Idea & Concept Generation 2) Studio Environment 3) *Researching* 4) *Time & Time Mgmt.* 5) Prior Learning & Experience 6) Peer Interaction 7) Professor Interaction	1) *Demands of Non-studio Classes* 2) Relevance, Motive, & Ownership 3) Studio Environment 4) Prior Learning & Experience 5) Peer Interaction 6) Professor Interaction 7) Idea & Concept Generation	1) Relevance, Motivation, & Ownership 2) *"Self" Sub-Processes* 3) Professor Interaction 4) Peer Interaction 5) *Design Processes* 6) Studio Environment 7) *Goals*

Figure 13 - Comparison of Issues Among Academic Years: Comparison of the most commonly noted issues among academic years. Most noted issues unique to each year are shown in italics.

The reason that students in different years emphasize one issue over another is because of their understanding of the process of design and the issues that they are dealing with as a result. For example, students that are learning about the role that finding precedent plays in the design process are more likely to express needs related to finding precedent such as gathering relevant information and using the library. Since students in each year of the program have a different understanding of the process of design and work on their own projects, they emphasize different issues and have different needs. SRL helps students address these needs. However, just as a student's understanding of design indicates their issues of concern, the student's use of SRL strategies varies based upon their awareness and application of effective strategies. The result is that students in each year not only have different concerns but also address those concerns through SRL in different ways. The next sub-section discusses the results of the interviews with third year students.

Findings Associated with Third Year Students

The interviews indicate that third year students were mostly concerned with seven issues (see Figure 14). These issues reflect what is happening to students as part of learning how to design. Therefore, self-regulating behaviors that will help them learn more about these aspects of designing are emphasized and more likely to be employed.

COMMON ISSUES IDENTIFIED AMONG THIRD YEAR PARTICIPANTS		
Issues Frequently Noted (7 or more times)	**Issues Occasionally Noted** (3-6 times)	**Issues Infrequently Noted** (1-2 times)
° Idea & Concept Generation ° Studio Environment ° *Researching* ° *Time & Time Mgmt.* ° Prior Learning & Experience ° Peer Interaction ° Professor Interaction	° Desk Critiques and Feedback ° Success in Studio ° Demands of Non-studio Classes ° Modeling ° Goals ° Help Seeking ° Relevance, Motivation, & Ownership	° Design Processes ° Representation & Presentation ° Getting Stuck & Unstuck ° Problem Solving Techniques ° Grades ° Authentic or Real-World Problems ° Precedent Use ° Working from Home ° Decision Making & Fitness ° Practicing Skills

Figure 14 - Common Issues among Third Years: Issues that are both frequently noted and unique to third year students are shown in italics.

The interviews show that one issue of primary importance among third year students is how to generate ideas and concepts for their design projects and how to know if those ideas are appropriate. One reason for this may be that third year students emphasize idea generation is that they are still beginning to learn (relative to fifth year students) about how an effective concept can lead to a successful design. As a result, third year students are more likely to engage in self-regulating behaviors that influence their ability to generate project ideas. For example, the student below talks about setting limits, apart from those set externally by the professor, in order to focus his or her ideas.

> THIRD YEAR STUDENT: I think I would have set more limits on it [the project]. Just because when you're too free on something and you don't have limits or requirements it creates a problem …it's kinda hard to go in there with a blank canvas, and I think a lot of what you want, rather than need, shows through in that case. (3:1, p.9)

By setting limits on his or her project, without the professor requiring it, the individual in the example is engaging in self-regulative behavior.

In addition to idea and concept generation, the interviews indicate that third year students also emphasized project research and time management. For example, the two students below describe how they are learning to deal with the issue of time management.

THIRD YEAR STUDENT: I think… you have to put in more time than is required. And I know, studio – well, when I came into LA I thought I would only have to go to class, do some work in class and turn in projects but I think you have to put in extra time. If someone else is going home, it's tempted to go home. But I think if you stay and work even if you're stuck, you'll push through it and then you'll be happy that you stayed there for an extra hour or two hours or three hours. And even if it's hard to stay in studio, I think that when I do my best work – is when I've been there for a while and I can really focus on it. (3:3, p.10)

THIRD YEAR STUDENT: Nights are pretty free I have several nights a week where I am obligated to be somewhere else, but I usually come up here late night and work. Ideally, there is the least amount of people here and the least amount of distractions, I think I can get some stuff done, you know. (3:2, p.2)

Each student in the example recognizes that time is an important factor in completing their studio projects and have therefore developed self-regulative strategies for managing their time. The first student's strategy involves staying an extra two or three hours more than required by the professor. In doing so, the student is demonstrating self-initiative and the motivation to become actively involved in his or her own learning. The second student's strategy involves coming into studio late at night in order to avoid distractions. Again, this student is self-regulating his or her behavior since it is his or her choice to come to studio rather than the professor's requirement.

One reason that these two students use different strategies lies in their understanding of how a design project progresses and the role that time and time management play within the design project. The first student understands that design is time intensive and requires blocks of time to focus on an issue. The second student understand that design is more about getting things done whenever he or she is not obligated to be somewhere else. Moreover, an awareness of other factors in design learning, such as distractions, perseverance, and production, also play a role in the form of SRL that each student chooses to engage in.

From the interviews, it is clear that both of these students are at different places in their design learning and thus use different strategies to self-regulate their time. This raises the question: is one of these strategies more effective than the other one is in terms of self-regulation and overall academic achievement? The second section of this chapter, "Study Findings Related to Academic Achievement," addresses questions similar to this one. The next sub-section presents findings associated with students in the fourth year of the program.

Findings Associated with Fourth Year Students

As with third year students, interviews indicate that fourth year students emphasize their own set of issues relative to the studio (Figure 15).

COMMON ISSUES IDENTIFIED AMONG FOURTH YEAR STUDENTS		
Issues Frequently Noted (7 or more times)	**Issues Occasionally Noted** (3-6 times)	**Issues Infrequently Noted** (1-2 times)
° *Demands of Non-studio Classes* ° Relevance, Motivation, & Ownership ° Studio Environment ° Prior Learning & Experience ° Peer Interaction ° Professor Interaction ° Idea & Concept Generation	° Reflection & Thinking ° Getting Stuck & Unstuck ° Representation & Presentation ° Decision Making & Fitness ° Problem Solving Techniques ° Precedent Use ° Help Seeking ° Resource Availability ° Self Sub-Processes	° Computer Use ° Design Processes ° Researching ° Strategy Use ° Time &Time Mgmt. ° Success in Studio

Figure 15 - Common Issues among Fourth Year Students: Issues that are both frequently noted and unique to fourth year students are shown in italics.

The interviews indicate that one issue of primary importance among fourth year students is the demands that non-studio classes have on their studio project. Demand from non-studio classes, refers to a belief among students (in the fourth year and probably earlier) that non-studio courses are so different from studio (i.e., designing) that they can become demanding in terms of the time and resources that they take away from studio. This occurs because it is becoming clearer to fourth year students that learning in other courses involves a different process than in studio – a process that compared to design is relatively linear and straightforward. Since the non-studio courses have fewer credits and usually require less sustained effort, fourth year students tend to view non-studio classes as demanding and nagging since the studio and design project are the real focus of their learning. Thus, in a sense, what fourth year students are emphasizing is the need to address how they spend their time and manage their resources.

Non-studio classes can have a positive or negative effect on the student's project depending on whether or not the student chooses to become actively involved in his or her own learning by managing the course load, project, and time. Moreover, these types of behaviors are essentially self-regulating since there is no professor to do it for the student. One other possible

explanation why forth year students emphasize time is that while they are beginning to see design as a process, they fail to understand how to engage that process. Thereby, the student feels that too much time is being consumed by other courses to address adequately the design process.

While courses taken in addition to studio are usually designed to relate to what is happening in studio (at least those courses taken within the landscape architecture department), the studio professor does not explicitly explain to students the symbiotic relationship between the two. Instead, the student is often left to make these connections for him or herself. This results in some students making the connection and others left waiting for the professor to tell them what to do. For example, the student below finds little relationship between the studio and the non-studio course.

> *INTERVIEWER: Do you ever bring the stuff you learn in those outside classes into studio?*
> FOURTH YEAR STUDENT: yeah I try to but ah its not you know that easy I guess. (4:7, p.11)
> *INTERVIEWER: Why not?*
> FOURTH YEAR STUDENT: Just because studio is so different from any other class because you know, you're doing actual design work and you're drawing and you're doing everything you're doing in studio where with every other class you feel like your just basically learning information and writing papers and doing assignments and it doesn't really compare to studio, and what you do in studio. (4:7, p.11)

In the example above, the student suggests that what happens in classes outside of studio is irrelevant to what happens in studio. This raises the question: why does this individual fail to see the relationship between the design project and what is learned outside of studio? The likely answer is that no one has told him or her to make this connection. In other words, without an externality such as the professor telling the student that there is a connection to be made, he or she does not see it. As a result, the interview relative to this individual does not reflect any self-regulating strategies or behaviors associated with this issue. The reason that forth year students, like the one cited above, emphasize these particular issues is the same as for third year students – their understanding of how to design, what the process entails, its components, or in other words their understanding of design learning. The discussion of effective and ineffective self-regulation occurs later in the second part of this chapter. The next sub-section presents findings associated with students in the fifth year of the program.

Findings Associated with Fifth Year Students

Just like third and fourth year students, the interviews indicate that fifth year students are concerned with their own set of issues (Figure 16). And, like the others, one possible reason for their specific concerns may be their understanding and lack of understanding of design, the design process, and what constitutes design learning.

COMMON ISSUES IDENTIFIED AMONG FIFTH YEAR STUDENTS		
Issues Frequently Noted (40 or more times)	**Issues Occasionally Noted** (11-39 times)	**Issues Infrequently Noted** (10 or less times)
° Relevance, Motivation, & Ownership ° *Self Sub-Processes* ° Professor Interaction ° Peer Interaction ° *Design Processes* ° Studio Environment ° *Goals*	° Time & Time Mgmt. ° Researching ° Desk Critiques & Feedback ° Grades ° Reflection & Thinking ° Success in Studio ° Modeling ° Representation & Presentation ° Project Planning ° Prior Learning & Experience ° Strategy Use ° Precedent Use ° Help Seeking	° Demands of Non-studio Classes ° Computer Use ° Non-Human Resources incl. Library ° Working from Home ° Getting Stuck & Unstuck ° Practicing Skills

Figure 16 - Common Issues among Fifth Year Students: Issues that are both frequently noted and unique to fifth year students are shown in italics.

The first issue that fifth year students emphasized relates to how they monitor and judge the quality of their work. The likely reason that fifth year students talked about this was because they were nearing the end of the program and were working on a predominately self-guided project. As such, they were concerned with finding out if they were effectively progressing on their projects or not. Since the fifth year students' professor has given the them a great deal of responsibility for their own projects, compared to earlier years, the students needed to monitor for themselves if what they were doing was right or wrong, effective or ineffective. As a result, fifth year students used self-regulated strategies and behaviors relative to self-judgment and self-monitoring. For example, the following student shows a deliberate strategy for monitoring the quality of his or her work.

> INTERVIEWER: *Why would you pin something up that you knew wasn't good?*
> FIFTH YEAR STUDENT: For clarification. If I didn't know how to go further, if I didn't know how to take the next step, I would hang it up and say here is what I have; here is what I was trying to do, help! (5:2, p.9)

The student's strategy might be questioned in terms of its efficacy but nonetheless it is a strategy that the student chose to use, apart from any external requirement, in order to monitor his or her progress. As such, it reflects a willingness to self-regulate and get the feedback necessary for continued learning. In addition, this student shows the progression that many students go through in terms of how they conceive of the process of designing. In earlier years, students struggle even coming up with a single idea and often fail to develop it fully. One possibility for this is because the student may not understand how to develop his or her ideas. As a student learns self-regulative behaviors like group brainstorming and voluntary pin-ups, the student begins to understand how to develop their ideas. Thus, by fifth year, the student begins to feel more capable in terms of coming up with ideas and demonstrates a greater willingness to develop them by whatever means they find effective.

A second issue that fifth year students focused on was design processes. Over the previous years, fifth year students had worked on many different projects and experimented with different methods and processes for designing. However, by the fifth year, the students had become more responsible for the process that they chose to use and how it was utilized. For example, the student below provides a broad analysis of his or her process.

> FIFTH YEAR STUDENT: In my particular case, I am doing a recreation master plan for an urban area …it started out in nothing but demographic research. The same thing that any urban planner could do, not necessarily a landscape architecture project, so… I have to start delving into the actual landscape. What can an actual landscape architect bring to this specific issue? What can they bring to this project? All right, now that you have the demographics done, how are you going to pick your site, as a landscape architect? Not just saying what can go here, what is best to go here. From there you can branch off and go to the actual site scale design saying what is around this site, what would be best for this particular site, then I would actually design it and then see how that design looks on to the overall of the entire recreation scheme. So, I can't get to that final looking at how my changes affect anything without doing the actual site scale design without looking at the site itself, without doing the recreation planning I did in the very beginning. It can be done just with a pure planning perspective, but again that's probably pretty shallow for a landscape architecture project. (5:2, p.3)

The student in the prior example depicts some of the issues that many fifth year students considered while engaging in the process of designing. Subsequently, SRL activities and strategies were used by the students, such as the one cited above, to help them meet their needs

relative to the issues they were addressing through design. One possible reason why fifth year students emphasized design processes is because they are at a point in their design learning whereby they mostly understand how to design, but are still struggling with the responsibility of making design their own. In other words, now that the fifth year student has the opportunity to engage in design through a process of their own choosing, they tend to dwell on the details of the process.

Finally, the interviews indicate that fifth year students also emphasized goals. For example, the following student shows how goals provide guidelines for knowing what to do and what not to do.

> FIFTH YEAR STUDENT: For myself again knowing my limits. I tried to tackle something that quite frankly I could never have completed and just the whole like going into a market analysis and there's just so many things that a landscape architect cannot do and solve, but you know, I mean, one of my biggest obstacles was just knowing, "what can I do" and basically, "what can I help or to improve the situation or to whatever" just knowing that, you know, there are a lot of people that just have huge projects this year and I think we're all trying to save the world and it's just completely impractical. Where some of them come just from when things are due, so you have to, I mean there are certain requirements that are just requirements that you have to meet, but the goals will probably change throughout the semester, but it's always good to have kind of a starting point and they will probably, I mean sometimes the goals even come as you are working and maybe you decided you need to look at the transportation or whatever but, so your new goal is now to you know complete that analysis by such and such date. However, it keeps you from kind of lingering on one point for too long. (5:1, p.9-10)

For the student above, goals provide limits and direction. The interviews indicate that the student in this example set many goals for him or herself, without explicit direction from the professor. As such, one can see the importance of self-regulation since without taking the initiative to set goals this student would have probably had difficulty completing their project. Actually, goals are fundamental to SRL since they create the standard upon which motivation and direction is derived. Since fifth year students tend to be less externally regulated by their professors it is not a surprise that they would emphasize the issue of goals more than students from other years did. In the earlier academic years, the professor gives the student many of his or her goals and requirements relative to the project. However, by the fifth year, the student is responsible for setting many of the goals for the project by him or herself. Thus, fifth year students emphasized the issue of goals. The next sub-section summarizes the most common issues associated with the three different academic years and discusses their implications for SRL on studio projects.

Summary of Findings Associated with Academic Year in the Program

The major finding that comes from looking at the interviews relative to the students'
academic year is that students emphasize different issues in each year of the program and that
these emphases influence the types of self-regulating behaviors and strategies that they engage
in. Figure 17 summarizes those issues that were most frequently noted during interview analysis
relative to each academic year and shows how some issues are of common concern while others
are year dependent.

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Summary of Issues among Academic Years

1. Working in the Studio (3rd Year)
1. Working in the Studio (4th Year)
1. Working in the Studio (5th Year)
2. Peer Interaction (3rd Year)
2. Peer Interaction (4th Year)
2. Peer Interaction (5th Year)
3. Professor Interaction (3rd Year)
3. Professor Interaction (4th Year)
3. Professor Interaction (5th Year)
4. Idea & Concept Generation (3rd Year)
4. Idea & Concept Generation (4th Year)
5. Prior Learning & Experience (3rd Year)
5. Prior Learning & Experience (4th Year)
6. Relevance, Motive, & Ownership (4th Year)
6. Relevance, Motive, & Ownership (5th Year)
7. Searching for Design Info. and Precedent (3rd Year)
8. Time & Time Mgmt. (3rd Year)
9. Demands of Non-studio Classes (4th Year)
10. Self Sub-Processes (5th Year)
11. Design Processes (5th Year)
12. Goals (5th Year)

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Figure 17 - Summary List of Issues Organized By Academic Year: The list is numbered from
most issues most commonly noted to least.

Based on the findings thus far, it seems that the issues that students emphasize are a
reflection of their understanding of how to design and what it means to learn in a studio. For
example, the interviews indicate that students in the fifth year emphasized the need to find
relevance in their work and maintain their motivation.

FIFTH YEAR STUDENT: I mean if you are working on a project for a year, even though the topic, I mean the idea of urban redevelopment, that in itself had meaning, but, it's just easier to do something that you have more passion about than just, "this is a project that I need to get done." Rather it's more, you know, just kind of goes to heart. I think it definitely affects your work. I think I, I just think that I have put more time into it than I would have if I just really didn't like I said had any kind of true passion for it. I mean it's not an assignment. I think it just affects the time and the effort that you put into it, yeah. (5:1, p.4-5)

By contrast, students in the third year emphasized generating and judging design ideas rather than motivation.

THIRD YEAR STUDENT: I get pretty frustrated… I was just kinda staring at it… I'm not getting anywhere, and you'll come up with an idea and its just like, not what you wanted. I guess that would be the best way to… how do I know that its something I don't want – I guess that would just be how it looks when I'm sketching it out. It just doesn't, feel right and it doesn't look right…its definitely, in my mind, and I can see it but I cant make it happen. (4:2, p.3)

Thus, for fifth year students it appears that motivation is a very important issue in terms of the studio project while for third year students it is less important. The issues that these students emphasize reflect what is happening to them as part of learning how to design in studio.

Since students in each year have different understandings of what designing entails, it makes sense that they would also demonstrate a different use of SRL. In other words, self-regulated activity results out of a need to address some design-related issue. If a student does not really understand the complexity of the evolution of a design and its related components then they are unlikely to recognize the need to engage in particular set of self-regulative activity. Likewise, self-regulated activities are necessary for learning how to design, especially in a more advanced, sophisticated way. In addition, once a student learns the basic process for designing, they are free to pursue additional design-related issues related to their projects. This is the point where an awareness of effective SRL becomes even more useful, since the student is moving beyond what is expected of them from the professor and into an area where opportunities for enrichment and optimal learning are enhanced.

For example, most third year students know that it is critical to landscape architectural design to do a sufficient analysis of the site. As a result, third year students will engage in behaviors related to site analysis. However, many aspects related to an effective site analysis are learned over time as a student progresses through studios and gains experience. Only those students who are aware of these more sophisticated aspects of site analysis can be expected to engage in related activities. Thus, a student's level of understanding in terms of site analysis or

any other aspect of landscape architectural design forms the basis for engagement in self-regulated activity. For example, the student below shows that additional understanding of parking has led to additional learning opportunities beyond those that were previously available to him or her.

> 3:1   … not so much like actual words. Its like I walk through a parking lot now and I don't just walk through a parking lot, and see cars and pavement. I walk through and I see the way drainage patterns are, or I can notice certain aspects of that parking lot that normally I would walk through and never see before. So I think in that respect it gives me a new vocabulary. So now if a professor gives us a site for studio, and we go visit the site or we have certain information about the site. I can understand a lot more about the site now, in that way its like I have a new vocabulary. (p.1)
> 3:1   I just become a lot more aware of things, I see all the landscape in a completely different way. Sometimes Ill be driving down the road and your not paying attention to where your driving, you know, looking around to notice some things but… (laugh). (p.2)

Likewise, self-regulation is required for students to gain the experience and sophistication in their understanding that will take them to the next level of learning. If a third year student has advanced knowledge relative to site analysis and a thorough awareness of self-regulative behavior then they can move beyond their classmates who lack either the same degree of knowledge or awareness. In this case, the advanced third year student is prepared for higher achievement since they can transfer cognitive resources and effort from figuring out how to do a basic site analysis and focus it on advanced issues like representing the site through images or writing.

At this point, it is reasonable to suggest how this information might help a studio professor improve his or her teaching and facilitation of SRL. First, by understanding that he or she has a great deal of control over the project and many of the subsequent issues that are raised within studio, the professor can be deliberate in how and when these issues are presented to the students. In this regard, the professor should consider each student's design learning and level of understanding before choosing what to emphasize. In addition, by emphasizing one issue over another, such as idea generation and development over graphic representation, the professor can influence the types of SRL that student are likely to employ. The result is an opportunity to diagnose a student's level of awareness in terms of SRL and design. By diagnosing students in this way, the professor can structure additional projects and issues in such a way that they make sense to students and are not beyond their capabilities. Of course, this approach involves some customization and flexibility in terms of instruction – two behaviors that present additional opportunities for enhancing student understanding of design and practicing SRL. The next

section examines the different ways that students' self-regulate their learning on studio projects and how this influences what they learn.

STUDY FINDINGS ASSOCIATED WITH STUDENT ACHIEVEMENT LEVELS

After identifying and comparing issues across academic years, the interview data was revisited and analyzed in terms of student achievement levels (i.e., high or low achievers). The purpose was to identify any issues and findings that might relate to a student's achievement level rather than academic year. Furthermore, the researcher was looking to see if students at different achievement levels used different SRL behaviors and strategies and how this might influence their studio projects. The examination initially resulted in two important findings that underlie other findings in terms of student achievement levels. These two initial findings are discussed below.

The first finding shows that high achievers are generally consistent in the ways that they talk about and engage different issues related to studio. The same is true for low achievers. For example, when high achievers talked about the issue of peer interaction or the ways that students work together in studio, they used similar terms and engaged in similar behaviors (see Figure 18).

SIMILAR DESCRIPTIONS OF PEER INTERACTION AMONG HIGH ACHIEVERS
I like that honesty. You know, here's someone with experience who doesn't like it and this is why. And I can kinda use that to make it better. Because if it can be better, that's a very good thing in my opinion. (3:1, p.9)
INT: When you go asking for advice, who do you go ask? Definitely a couple of students around me probably. (4:2, p.5) I guess I've seen what they've done in the past and I respect it you know…(4:2, p.5)
There's normally about 2 or 3 people that I talk to more than anybody else? Because they're friends of mine whose skills I respect and I can get honest answers out of them. (5:3, p.9)

Figure 18 - Similar Descriptions of Peer Interaction Among High Achievers: Shows how high achievers conceptualize SRL behaviors and activity related to peer interaction in a similar way.

The reason why these students engage in the same types of behaviors is not that they are high achievers, but that as high achieving students they have advanced knowledge of the components that make-up designing and they understand how to work effectively inside the studio environment. One might expect that they became advanced by engaging in certain types of activities that support learning in a design studio. Many of these activities, such as goal setting, are predominately self-regulative and compound in their effectiveness as students gain familiarity with them. Thus, high achievers have a better understanding of design and a greater familiarity with effective SRL strategies.

If a student is advanced, meaning for example, they do not need to spend copious amounts of time and effort coming up with ideas for their projects and then developing those ideas into a viable schematic plan, then they will have the self-efficacy needed to set additional goals and address additional issues within the project. The result is bonus opportunities for enhanced learning and greater achievement.

For those students who are already struggling to produce ideas and turn them into a viable plan, additional goals and expectations, whether internally or externally generated, will result in bonus opportunities that will never be realized. In other words, expecting too much of students who do not understand how to design is counterproductive to design learning. Thus, the first finding relative to student achievement level and SRL suggests that students engage in similar activities because they have a similar understanding of designing and greater familiarity with SRL activities that support learning in studios.

The second finding shows that while students say they are concerned about the same issues in studio, they tend to engage in different behaviors relative to those issues. For example, in terms of issues related to professor interaction, or the ways that students work with their professors on studio projects, high achievers tend to do things like deliberately seeking out a particular professor to talk with or ask a professor to review their work outside of scheduled studio times. By contrast, low achievers tend to avoid their professor late in the project in order to avoid having to make changes or ensuring that they achieve each of their professor's suggestions regardless of their own goals. Figure 19 shows how high and low achievers who are talking about the same issue, professor interaction, describe their behaviors differently.

DIFFERENCES AMONG HIGH AND LOW ACHIEVING STUDENTS IN TERMS OF PROFESSOR INTERACTION	
HIGH ACHIEVERS	**LOW ACHIEVERS**
They [professors] never really give you ideas, it's more like questions. They'll just present a list of questions for you about what you should be thinking about, so that's nice because I'm not looking for a solution really. (4:3, p.13)	…of course I had to talk to my professor first, to see, if you know, my ideas were gonna work, if these ideas were feasible. And for the most part she liked my design program and, you know, told me a few things I needed to do, you know, those modifications. And I made those... (4:7, p.8)

Figure 19 - Basic Differences Among High and Low Achievers in Terms of Professor Interaction: Shows how high and low achieving students differ in terms of the way that they engage in peer interaction.

The question the second finding raises is why are students engaging in different behaviors when they emphasize the same issues? Again one might assume that it is related to their level of understanding of design and their ability to engage in effective SRL in the design studio. Students must have an awareness and understanding of something before they can effectively use it. High achievers know more about how to interact with their professors in order to get the information that they need relative to low achievers. High achievers developed this knowledge by engaging and interacting with professors. In other words, engagement resulted in understanding and success, which in turn supports future engagement. In self-regulative terms, the student is building self-efficacy, or the belief in his or her own capability to engage successfully in a particular task or behavior.

Self-efficacy is one of those concepts, like design, that involves an investment of time, thinking, and effort in order to gain a return that affords additional investments. The result is a compounding process of effort breeding more effort and success creating more success. The reason that low achievers are less likely to experience gains in their self-efficacy is because they have a less sophisticated understanding of the complexities of design and are less affective in their ability to utilize self-regulating activities to their benefit. Less knowledge equates to a diminished ability to invest the necessary resources into taking risks and learning new things because the process of design already stresses them cognitively and motivationally. The eventual result is a markedly different approach in terms of how high and low achieving students self-regulate their learning on studio projects. Thus, this finding is the more significant of the two initial findings since it lays the foundation for examining student achievement levels in terms of

how different SRL behaviors and strategies influence student learning and achievement on studio projects.

The next sections build specifically on the second finding by showing the differences between high and low achieving students in terms of how and why they self-regulate their studio projects. In doing so, other study findings are presented and related to both landscape architecture studio projects and SRL. No new issues, beyond those identified in the previous section (Figure 17) and summarized in Figure 20 below were identified. Thus, these issues will be used to organize the study's findings related to the differences between high and low achieving students.

**Summary Of Common Issues Among
Academic Year and Achievement Levels**

1. Working in the Studio
2. Peer Interaction
3. Professor Interaction
4. Idea & Concept Generation
5. Prior Learning & Experience
6. Relevance, Motivation, & Ownership
7. Searching for Design Info. and Precedent
8. Time & Time Mgmt.
9. Demands of Non-studio Classes
10. Self Sub-Processes
11. Design Processes
12. Goals

Figure 20 - Common Issues among Academic Year and Achievement Levels: Summary list of issues organized by academic year.

Differences between High and Low Achievers in Terms of Self-Regulated Learning

This section uses the issues summarized in Figure 20 as a structure for discussing the differences between high and low achievers' conceptualizations of studio and subsequent SRL. For each issue, interview excerpts from high and low achieving students are provided to illustrate the differences in how each group approaches the studio project in terms of SRL.

Working in Studio

An examination of the interviews in terms of how high and low achievers conceptualize the studio environment shows that although both high and low achievers recognize studio as an

important workplace, only the high achievers utilize it as a place for sharing ideas and getting feedback (Figure 21).

DIFFERENCES AMONG HIGH AND LOW ACHIEVING STUDENTS "WORKING IN STUDIO"	
HIGH ACHIEVERS	**LOW ACHIEVERS**
HIGH: … I see the Studio time as not necessarily my main working time, but it's time where I can kind of judge my work, you know, because I have those people here, the professor and just the other students to tell me about it, you know…(3:2, p.10) HIGH: I like the, freeness between all the different years in the studio. I like that I can go talk to a fourth year about something or a second year or fifth year or grad student. I enjoy that, I like it. I like the fact, like I said earlier, when I get stuck I do like to walk around my own class but sometime I don't just stick to my studio. I can get inspiration from 100 other people in the program. It's nice. I like that. (3:1, p.10)	INT: *How would you describe Studio this Fall?* LOW: Very laid back and relaxed, I don't feel like I have to come in very much and I haven't been. (5:7, p.1) LOW: Because there is no dedication, that's the reason, they [professors] don't seem as they really care, they don't try to get in touch with us. (5:7, p.1) LOW: … the professors don't really care if you are here and so I feel like I shouldn't really even be here, I don't really, if they don't care, then I don't care. (5:7, p.1) LOW: Just by looking at their projects. Not necessarily how they go about doing the work but by looking at their finalized project compared to yours you can see a lot. (4:6, p.6) INT: *So would you say you learn a lot from looking at other people's projects?* LOW: Yeah I would say a lot, a great deal. Not necessarily having them standing there explaining it but just looking at it …(4:6, p.6)
The high achiever takes the initiative to come to studio and sees the professor and other students as sources of knowledge and feedback.	***The low achiever sees the professor as an external regulator and motivator that should take the initiative to engage him or her.***
HIGH: …In studio, I definitely find it easier to be here when the professors are here or when other people in my class are here. You know to share ideas with them. There are some days when I just don't want to be here when maybe it's too loud or I'm really moving ahead on my project and people are distracting me. For the most part I enjoy my studio time. But I do like doing the bulk of my work at home on my drawing board, where it's a lot quieter. (3:1, p.8)	LOW: … actually I worked at home this semester. (5:7, p.8) INT: *Why did you work at home this semester?* LOW: Too many distractions. (5:7, p.9) INT: *What kind of distractions?* LOW: Friends. (5:7, p.9) LOW: …Because I would rather talk to them and do stuff with them and listen to music, whatever, then do a project. (5:7, p.9)
Despite the distractions, the high achiever values studio as a source for receiving feedback that facilitates learning.	***The low achiever sees the studio and his or her friends as distractions that diminish opportunities for learning.***

Figure 21 - Differences Among High and Low Achievers – "Working In Studio": Shows how high and low achieving students differ in terms of how they conceptualize working in the studio. Findings shown in boldface and italics.

High achievers see the studio's primary role as a living place for talking with other students and professors about their project ideas and processes in order to get important feedback (Image 2). As a result, high achievers are able to obtain the necessary

ingredients for self-regulated learning. In this way, interaction in the studio is a pre-condition for working in the studio. This is likely occurs for a couple reasons. First, high achievers are clear about their goals and what they want to accomplish in studio. This clarity comes from a familiarity with the process of designing and related SRL activities. Thus, when high achievers come to studio, they have some notion of what they want to accomplish. In addition, over time, the high achiever must have contributed his or her success on the design project and in studio to certain behaviors that they had used in the past. For example, he or she might have attributed their inability to get work done to talking too much with their friends, thus learning that chitchat is not effective behavior in terms getting a project finished.

Image 2 – Studio Environment: Students and professor interaction in studio.

By contrast, low achievers tend to see the studio as a space that includes a desk and distractions in the form of their friends and neighbors. In this way, low achievers miss the opportunities to test their ideas and get feedback related to their progress. They do not see interaction as a positive pre-condition or integral part of working in studio. In doing so, their ability to self-regulate is diminished. For low achievers, this occurs because they do not see the role that criticism and feedback plays in idea generation and development. As a result, they fail

to value their friends and classmates as sounding boards and sources of help. Rather, they see them as obstacles to effective design.

Peer Interaction

An examination of the interviews in terms of how high and low achievers utilize peer interaction shows that high achievers actively seek to build relationships with their peers and more advanced students for the purpose of increasing their knowledge and facilitating learning (Figure 22). High achievers do this by choosing to interact with individuals that they respect and have had positive experiences with in the past. In addition, by talking with students who have advanced knowledge (likely to be other high achievers), high achievers receive experience-based feedback about their present progress on their project as well as the opportunity to learn advanced skills and knowledge. One possible reason is because the high achiever can recognize other high achievers and thus sees the interaction as potentially beneficial. By contrast, a low achiever might not recognize the high achiever, and thereby misses seeing the benefit of interacting with them while even feeling embarrassed or incompetent if they do interact.

Low achievers build more superficial relationships in studio. As such, they feel like they are disenfranchised and left out of the learning loop. This occurs because the low achiever recognizes that learning occurs in studio but is not clear how his or her classmates are involved. By not attributing their past success in studio to critical discussions with their classmates, the low achiever may disregard the positive benefits of peer interaction. As a result, the low achiever becomes frustrated by his or her own inability to monitor progress and predict future obstacles. Furthermore, since the low achiever is likely to have poor self-efficacy, he or she is unlikely to approach advanced student for the purposes of modeling advanced behaviors since this would involve taking on tasks that they believe they would be incapable of successfully completing. Thus, the low achiever is handicapped by his or her unwillingness to become more actively engaged in studio.

DIFFERENCES AMONG HIGH AND LOW ACHIEVING STUDENTS "PEER INTERACTION"	
HIGH ACHIEVERS	**LOW ACHIEVERS**
HIGH: …it took a while to actually, create relationships with people in studio…but I got to know more people and so now it's a lot easier because I can say – hey do you have any idea about what this project is about and we can kinda make a class judgment on how we feel about it. And I think that's really good because I think sometimes people end up, you know, grabbing onto one idea and then there's not as much diversity as there could be. But in another way, it allows us to, you know, learn from each other. And apply something I learned from someone's project last semester to my project this semester. (4:1, p.4)	INT: *How do you go about getting feedback?* LOW: I guess I would have to be more vocal and outspoken and just go up to certain people and just ask them hey would you come up and see my ideas and tell me what you think about it. I guess that's really one of the problems that I have, I really don't think I do that enough. Go out and talk to people and make yourself known and have people come over and talk about your design. (4:6, p.10)
High achievers create meaningful relationships with other students for the purposes of improving their learning.	***The low achiever focuses on the outward appearance of the relationship with other students rather than the meaningful contribution the relationship can make to their learning.***
INT: *When you go asking for advice, who do you go ask?* HIGH: Definitely a couple of students around me probably. (4:2, p.5) HIGH: I guess I've seen what they've done in the past and I respect it you know. And some of them I can talk to better than the other people. And it's easier for me, to have an, easy going conversation with them. And get past all the formalities… (4:2, p.5) HIGH: There's normally about 2 or 3 people that I talk to more than anybody else? (5:3, p.9) HIGH: Because they're friends of mine and I can get honest answers out of them. (5:3, p.9)	LOW: …Maybe some of your peers that you talk with on a regular basis will give you feedback. Professors don't always necessarily give you that good of feedback. Or whoever else is around you. That makes it kind of independent for me anyway. (5:5, p.1) LOW: The fact that you don't really have other people helping you. (5:5, p.1)
The high achievers are deliberate about who they interact with in order to seek the type of feedback that lets them know if they are progressing towards their goals.	***The low achiever does not discriminate about whom they interact with and are less clear about what they are looking for, depending on people around them to tell them what to do next.***
HIGH: How we all sit together and there's opportunity for a 2nd year to talk to a 5th year. I think it's good because you have the opportunity to look at everyone's work and see what someone in 5th year is doing. You know, what you might be doing in the future. And, learn from them. I think that is good because it helps you see different levels. (3:3, p.11)	LOW: …I mean there are certain things that you, that would really help you if you knew before hand…I think that things should be more direct. I think there could be some more directed knowledge taught. Students would really benefit from more than just, saying alright here are these ideas and if you wanna learn these or have time go ahead and learn them. (4:6, p.14)
The high achiever seeks to improve his or her learning based upon deliberate interactions with advanced students.	***The low achiever recognizes his or her need for additional learning but takes little responsibility for seeking the knowledge on his or her own.***

Figure 22 - Differences Among High and Low Achievers – "Peer Interaction": Shows how high and low achieving students differ in terms of the way that they engage in peer interaction. Findings shown in boldface and italics.

The interviews indicate that peer interaction tends to occur throughout the project. However, high achievers begin to create meaningful relationships with other students that they trust and respect early in the program. In addition, high achievers tend to seek help from particular students, as needed, in order to learn a specific skill. This occurs after they have started setting goals and working for a period of time in order to receive feedback that will let them know how well they are progressing. There may be several reasons for this. It could be that the high achiever sees the benefit to this interaction; or it could be simply social grouping or common interests, but the result is that high achievers are positioned to benefit from this type of SRL.

The low achiever tends to seek help from whoever is nearby for the purposes of getting information that will tell them what to do next. The low achiever does this because he or she is less concerned about time and its relationship to accomplishing their goals. This means that the low achiever is probably less clear about the relationship between feedback, goals, and the design process. As a result, the low achiever does not understand that the design project requires a progressive evolution of ideas that each need goals and sub-goals, and that these goals come predominately from the student him or herself. Therefore, the low achiever is less likely to use goals as a guide for interacting with their classmates. As a result, the low achiever is less deliberate about whom they interact with and when.

Professor Interaction

An examination of the interviews in terms of how high and low achievers utilize professor interaction shows that high achievers view the professor as a partner and source of knowledge that they selectively choose to consult with based upon their needs and the professor's experience (Figure 23). This happens because high achievers know that design requires experience and feedback. In the studio, the professor is often the most experienced designer and thereby one of the best people to solicit feedback from. In addition, the high achiever realizes that building experience in design is not something that you learn by being told, it is something you learn through active engagement. Thus, the high achiever does not expect the professor to tell him or her, what to do, but instead facilitate the engagement and guide them in

the general direction of discovery. In doing so, the high achiever gains a sense of ownership for the project while incorporating the experienced and salient comments from their professor.

DIFFERENCES AMONG HIGH AND LOW ACHIEVING STUDENTS "PROFESSOR INTERACTION"	
HIGH ACHIEVERS	**LOW ACHIEVERS**
HIGH: They [professors] never really give you ideas, it's more like questions. They'll just present a list of questions for you about what you should be thinking about, so that's nice because I'm not looking for a solution really. (4:3, p.13) HIGH: … I usually find that maybe I think I'm going about it one way, and someone can sit down, like the professor, and you know, read it a completely different way. And it's interesting that I can then look at it from their perspective as well, and see what they're talking about. And see my same project in a different light but still keep going in the direction I'm going. See how other people are going to view it. (3:1, p.7)	INT: *How have you learned to do that?* LOW: By meeting with Professor X and coming with the work that I have and you know, there's some days when she says you need to have more and there's some days when she says that I've done okay and so, having her there to guide me has been what I've really needed and if I hadn't met with her at all this semester I would be totally lost in terms of where I would need to be with my work. (5:6, p.13) LOW: [When talking to studio professors…] I just basically explain what I've got. Get a sense of where I need to be, what the goals of the project should be. And they actually work things out for you. This semester, Professor X she actually umm, helped me produce my thoughts... (4:6, p.2)
The high achiever views the professor as a partner and additional source of knowledge and feedback with whom they share their ideas and goals.	*The low achiever views the professor as the sole source of knowledge and direction from which they receive their goals and define the scope of their projects.*
HIGH: Um, with each faculty member, you know, if they have more experience on a certain area, their definitely going to, well I would hope would have more insight onto my specific problem. If I had gone to someone who had never worked in an urban environment, they would likely not be able to point me in another direction towards, well not the answer that I want, but the one I need. (5:2, p.2)	LOW: And sometimes you are definitely thinking what the professor wants, I mean you think of what is the name of the class and what is the goal of the class. When we are doing the urban design studio, so there are certain things that she would like to see I guess… (4:5, p.13)
The high achiever examines their needs and seeks help from those who are most experienced.	*The low achiever defines their needs in terms of their class and who their professor is.*
HIGH: … there was some things [the professor said] you couldn't use. And when he came to your desk, you know, if you had a good reason why you didn't want to use something, if you could prove that… you'd have to show him that in your drawings and tell why. Or you couldn't just throw something [a teacher's requirement] out. (3:3, p.7)	LOW: (laughs) Grades. That's not the only reason but first of all, you know if your teachers suggests something then it would be, just almost stupid to not do what they say because they obviously know much better than we do. I mean… (4:7, p.4) INT: *Is there ever a time that you don't make the modifications?* LOW: Probably not. I wouldn't say too often if any. (4:7, p.4)
The high achiever addresses the professor's most salient concerns but maintains ownership for their work by questioning both the professor's and their own thinking.	*The low achiever attempts to address all of the professor's concerns regardless of his or her own ideas and goals.*

Figure 23 - Differences Among High and Low Achievers – "Professor Interaction": Shows how high and low achieving students differ in terms of the way that they engage in professor interaction. Findings shown in boldface and italics.

The low achiever, by contrast, sees the professor as having the answer and the provider of goals and direction. As such, the low achiever is unwilling to deviate from the professor's comments even when they are in conflict with their own goals. The reason why this happens is because the low achiever perceives design as something you learn by reflecting what good designers say and do, including their goals. In other words, since the professor is the expert in the studio, the student respects their knowledge and attempts to reflect is as closely as possible. Thus, learning, to the low achiever, is a result of how close he or she matches the professor. As a function of these beliefs, the low achiever is unlikely to put his or her goals ahead of those of the professor.

The interviews indicate that high achievers tend to interact with their professors after setting goals in order to get feedback that lets them know how well they are meeting the expectations that they have for themselves and their projects. This type of behavior can only occur if the student understands that within design, a relationship exists between goals, feedback, and the outcomes of the design, and that as the designer he or she is proactive and empowered within this relationship rather than reactive and subordinate. High achievers understand that in design, the designer has to take responsibility for goal setting and obtaining feedback, responsibilities that requires steady progression and development, not taking the first idea that arises and putting it into form. However, in the case of low achievers, they usually interact with the professor very early in the project, before setting goals, in order to find out from the professor what their ideas and goals should be. The low achiever, who may already have trouble generating ideas and setting goals, does not understand their own role within the relationship between goals, feedback, and effective design. In this way, the low achiever understands his or her role in this relationship as being reactive and subordinate to the professor. As a result, they are unlikely to take charge of the relationship, and thus they set few goals for themselves.

Idea and Concept Generation

An examination of the interviews in terms of how high and low achievers generate ideas and concepts shows that high achievers generate multiple ideas for their projects by consulting with a range of different people including their classmates (Figure 24). In addition, the high achiever sets limits to his or her project to help narrow the scope of the project and guide the

search for appropriate ideas. This happens because the high achievers understand that design requires a thorough exploration of possible ideas and solutions (Image 3). This means that the designer must generate multiple ideas. However, since the process of design can be complex and time consuming it must also be limited in order to avoid wasting resources. This means that the designer must set limits on their exploration by using goals and criteria. The high achiever understand these aspects of design better than the low achiever does and therefore sets criteria and generates ideas within those criteria.

In addition, the high achiever understands that design requires feedback relative to the exploration of ideas in order to test their viability and appropriateness. In landscape architectural design, this occurs by making drawings and representations of the idea and then getting feedback from clients or in the case of studio, peers and professors. Since the high achiever understand this important aspect of designing, they are more likely to engage in a process of generating ideas, representing them, and sharing them with others in order to test their appropriateness.

DIFFERENCES AMONG HIGH AND LOW ACHIEVING STUDENTS "IDEA AND CONCEPT GENERATION"	
HIGH ACHIEVERS	**LOW ACHIEVERS**
HIGH: I think you have ideas in your head, no matter if it's right or wrong, this is the way you like it, but you always start asking other people: so what do you think? I mean, is this the idea? Like, you ask the classmate, can you get this out of this? Are you pulling this out? Or, am I the only one that sees this sort of idea? (4:3, p.11)	LOW: I don't know, sometimes you get an idea in your head and you get so far along in your design process that he would say something that maybe might want to make you change it but you just, you've put so much effort and time into it that you don't want to change it or maybe you don't think, maybe I don't think that I should change it because of the way I think of my design and the way I think it should work. But, other times, you know, you think about it and you realize that maybe he has a point. (3:5, p.3)
The high achiever generates multiple ideas and develops them by eagerly talking with classmates and other people.	*The low achiever tends to generate one idea and reluctantly shares it with others in order to avoid having to modify it.*
HIGH: I think I would have set more limits on it [the project]. Just because when you're too free on something and you don't have limits or requirements it creates a problem …it's kinda hard to go in there with a blank canvas, and I think a lot of what you want, rather than need, shows through in that case. (3:1, p.9)	LOW: …with the individual project you don't really have anything holding you back and you can just do anything you want to do. Anything you envision in your mind you can do that. As opposed to the group project, when, you might think you have a great idea and, you know, your fellow group members just fire hose you. (4:7, p.5)
The high achiever sets limits on the project and him or herself in order to make the project more manageable.	*The low achiever associates no limits with the project except for those set by other people.*

Figure 24 - Differences Among High and Low Achievers – "Idea and Concept Generation": Shows how high and low achieving students differ in terms of the way that they generate ideas and concepts for their projects. Findings shown in boldface and italics.

The low achiever, by contrast, tends to generate a single idea with very little input from other people. He or she then shows a reluctance to share that idea with others. Thus, changes are not suggested, which he or she would of course have to make. In addition, the low achiever often avoids setting limits for their projects since they may not know what limits to set. One possible reason for these behaviors is that the low achiever does not understand that design involves the evolution of thoughts to a more refined state. A process that benefits from multiple ideas and feedback from multiple people. The low achiever has not learned that changes and modifications are an essential part of finding a fitting solution to a design problem since there is not one right answer in design. Furthermore, since the low achiever attempts to defer to the professor, and thus takes a reactive approach to their project, the low achiever does not actively set limits to their search for ideas. This may have an effect on the student that results in lowered self-efficacy. The student may become so overwhelmed with the possibilities that they feel they are incapable of

sorting through them all and finding the right solution. The result of lower self-efficacy is a likelihood that the student will not attempt to engage in the same behavior – developing multiple ideas – in the future.
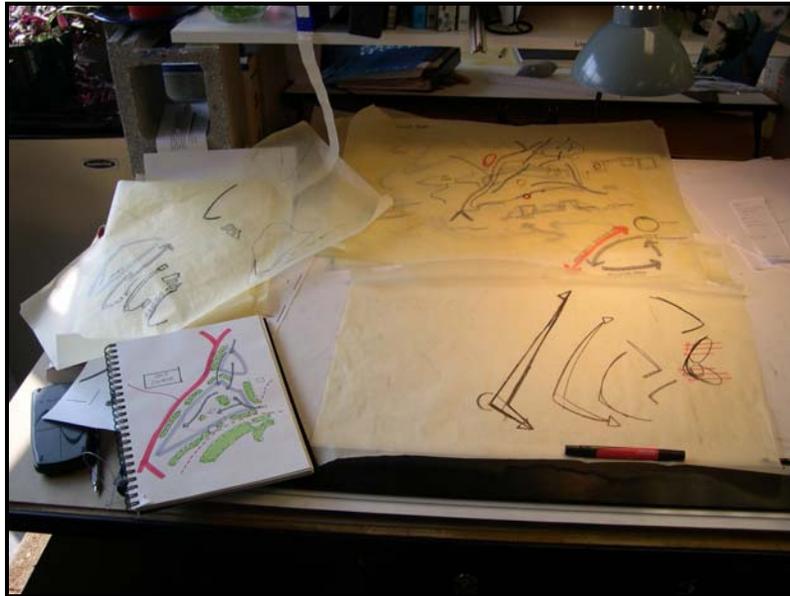

Image 3 – Idea and Concept Development: Sketches, drawings, and notes help a student generate ideas that lead to feedback.

Prior Learning and Experience

An examination of the interviews in terms of how high and low achievers integrate their prior learning and experience into the studio project shows that high achievers turn their past experiences in studio into a growing body of knowledge that they can reference in order to guide their current and future effort (Figure 25). The reason why high achievers are able to merge their past experiences with their current project is that they have a better understanding of both the process of designing and the components of design. In design, appropriate concepts and ideas are rarely original; rather they have a foundation in past experience and precedent. Once precedent is established, it is modified to fit to the current site or problem. The high achiever understands this about design and as a result becomes aware of the influence that their experiences both inside and outside can have on their design projects. They also realize that identifying potentially useful experience and precedent is only the first step in a process of achieving fitness.

DIFFERENCES AMONG HIGH AND LOW ACHIEVING STUDENTS "PRIOR LEARNING AND EXPERIENCE"	
HIGH ACHIEVERS	**LOW ACHIEVERS**
HIGH: Its [student's current work compared to past years work] taken a lot from the last project we did last semester. It was the ASLA competition for a park or whatever. And ah, the ways we represented it on the computer and drawing it with hand and all that. I didn't get stuck in that but I built on that. I liked what we did there; me and another student, and we built on it, like big time, and did just as good I think. (4:2, p.10) HIGH: Built on it by… using the same series of things like, you know, site analysis, concept, process and we pretty much repeated the same thing for this year. (4:2, p.10) HIGH: …the same steps we did inside each of those process steps. (4:2, p.10)	LOW: Sometimes I can say, yeah I've done what I need to do, and I feel really good about it, but other times, I'm just like, well, I know I could do more. (5:6, p.12) *INT: Where does that criteria come from to make those judgments?* LOW: I really don't know. It just, I mean, I guess it's almost distinguishable or sixth sense you know, sometimes you just know. (5:6, p.12) *INT: What's been a hindrance to your success?* LOW: Umm, (longest pause, 20 seconds or more). I don't know that's a tough question. I guess, like I said the allotted time we have for projects is a hindrance. Just lack of experience, you know, only doing this for two or three years like we've been doing, I'd say is a hindrance. (4:7, p.11)
The high achiever uses what he or she learned from past projects as a foundation and guide for their current project.	***The low achiever feels that they have no criteria to guide their present efforts since they lack the ability to see how their past experiences inform their current projects.***
HIGH: … And I think it's because like I said earlier, I have a new vocabulary. I'm starting to develop the skills to do that. Its, I guess, probably part of the learning process and that's why we're here. (3:1, p.9) HIGH: …So now if a professor gives us a site for studio, and we go visit the site or we have certain information about the site. I can understand a lot more about the site now, in that way it's like I have a new vocabulary. (3:1, p.1)	LOW: When I talk to my teacher its kinda like, your on two different levels, and you don't understand what they're looking for and what they want you to do. And that's not what your always worried about, your worried about your project but, you want them to understand where your trying to go. A lot of the times when I talk to teachers, like I have trouble trying to get across what I'm doing because of I don't have the same vocabulary, like the same level as certain teachers. You just feel like you're not on the same level... (4:6, p.3)
The high achiever translates their past experience into a growing body of knowledge from which they build advanced understanding.	***The low achiever has difficulty communicating with the professor since he or she is unable to translate their studio experiences into usable professional knowledge.***

Figure 25 - Differences Among High and Low Achievers – "Prior Learning and Experience": Shows how high and low achieving students differ in terms of how they integrate prior learning and experience into the studio project. Findings shown in boldface and italics.

The low achiever, by contrast, is unable to make connections between his or her past experience and their current work in studio. As such, the low achiever feels that they lack criteria for decision-making and the ability to communicate effectively with their professors. This may happen because the low achiever does not understand that there is a relationship between past and present landscape architectural design – in that it is a generally progressive and interrelated set of ideas and principles that become manifest in form. As such, a catalogue of past work exists

for the designer to use for inspiration, analysis, and criteria development. Moreover, the designer him or herself creates a catalogue of their own to use on their future projects. The low achiever is not aware of the importance of developing such a catalogue and fails to understand how the past informs the present. If the low achiever does recognize the importance of the past, as experience, he or she may then view themselves as less experienced than the professor and thus rely on the professor to share his or her catalogue. In either case, the result is that the student does not build up a catalogue for himself or herself and thus remains reliant on having to be told what to do and not engaging in SRL.

Relevance, Motivation, and Ownership

An examination of the interviews in terms of how high and low achievers conceptualize relevance, motivation, and ownership related to the studio project shows that high achievers find relevance in the experience of working on different kinds of projects (Figure 26). High achievers tend to benefit from the project even when it is difficult or setbacks occur. They believe this because they value different types of learning experiences. One possible reason for this is that high achievers are capable of finding value in their learning is because they realize that design is learned through the experiences associated with the process of generating ideas, trying them out to see if they work, and then changing them as needed. Not only is design learned this way, but designing is this way. In other words, the high achiever realizes that learning to design is essentially engaging in design itself. Since they realize that setbacks and false starts are part of designing, they do not become discouraged when difficulties occur as part of learning. The result is the ability to remain focused and motivated as they progress through their projects.

DIFFERENCES AMONG HIGH AND LOW ACHIEVING STUDENTS "RELEVANCE, MOTIVATION, AND OWNERSHIP"	
HIGH ACHIEVERS	**LOW ACHIEVERS**
HIGH:… at first cause it was a real realistic project and that's really hard to come by in Studio because usually the project is given to you out of something out of thin air, so this is more of a reality based project and so if you had real people and their real life situation and their problems… (4:3, p.1) HIGH: I think it [a reality-based project] just prepares me for the future and it gives me a taste of what things are going to be like if I chose to go into something like this... I try to find that in every project… (4:3, p.1)	LOW: …its just kind of like busy work…just like we have a project and it would be a real project but we'd have like little deadlines in the project and it would be just like, like I don't need to do this, it's not the way I like to design or I wouldn't do this if I was doing my design process. (3:5, p.6)
The high achiever sees the project as a beneficial learning experience that prepares them for the future.	*The low achiever is unable to see the value in the project and sees it as a busy work.*
INT: Why not just do what the professor says? HIGH: Well, I have this semester. (4:1, p.2) *INT: Why?* HIGH: Because she said I had to. (4:1, p.2) HIGH: [the professor] just said it wasn't realistic. Umm, and… so I feel like that made me a LOT less interested and a LOT less creative. I guess I just have a lot less interest in the projects because I feel like I can't do what I want to do. And then, I feel like I'm losing a part of myself that I really feel was important. (4:1, p.2)	LOW: Um, I would require attendance… as part of the grade. Because it forces me to work on this project 12 hours a week. (5:7, p.12) LOW: …I need a kick in the butt to say, you know, this is what you need to be doing, you know, you need to, do this, do this, do this… I need to have things spelled out for me…I mean there was a time, I guess a year ago, that I wasn't doing good work and didn't know it, and that's a problem. (5:6, p.8)
The high achiever attempts to integrate freedom and personal choice into the project in order to enhance motivation.	*The low achiever is motivated by less freedom and personal choice instead attempting to be directed externally.*
HIGH: I would sit down with the faculty, they would give me great ideas and I wouldn't know where to begin because… this is suppose to be my project, my ideas, I'm suppose to figure out the way to get from point A to point B from beginning to end and if they hand it, if a faculty member handed me the idea, handed me their particular answer it wouldn't be my project anymore… I knew where I wanted to go... (5:2, p.7)	*INT: How would you describe Studio this Fall?* LOW: Very laid back and relaxed, I don't feel like I have to come in very much and I haven't been. (5:7, p.1) LOW: Because there is no dedication, that's the reason, they [professors] don't seem as they really care, they don't try to get in touch with us. (5:7, p.1) LOW: … the professors don't really care if you are here and so I feel like I shouldn't really even be here, I don't really, if they don't care, then I don't care. (5:7, p.1)
The high achiever want responsibility for his or her project and resists excessive direction that limits the student's ownership for the work.	*The low achiever takes little ownership for the project instead expecting that since the project belongs to the professor then he is released from any responsibilities.*

Figure 26 - Differences Among High and Low Achievers – "Relevance, Motivation, and Ownership": Shows how high and low achieving students differ in terms of finding relevance in their work, motivation, and exercising ownership. Findings shown in boldface and italics.

The interviews indicate that, among other things, high achievers are motivated by opportunities for integrating their ideas and goals into the project. The interviews suggest that they are de-motivated by excessive external regulation. This occurs because the high achiever feels the need to be creative and feels that rules and directions are often stifling (Image 4).
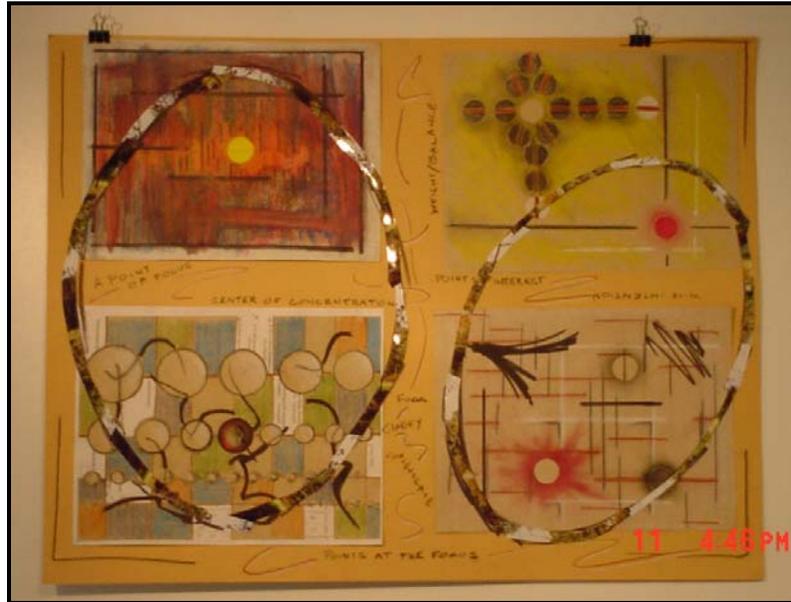

Image 4 – Creativity is Motivating: student creatively explores the concept of "focal point" in design.

The interviews indicate that the low achiever, by contrast, does not need the same freedom and decision-making opportunities as the high achiever since their motivation is based on pressures like trying not to waste time and trying to meet the professor's expectations. This happens because the low achiever does not understand the important role that creativity plays in motivating the design and designer. They see creativity as primarily something that wastes time since it involves testing and re-testing (low achievers rarely generate and test multiple ideas), and something that might suggest to the professor that they are deviating from their expectations by becoming creative. Therefore, since the low achiever see learning as getting work done on time and meeting the professor's expectations, they are unlikely to view creativity as a motivating factor in their learning or design. The result is

creativity can become de-motivating for the low achiever since it takes them into an area of learning that is different then their conception.

The interviews indicate that high achievers view excessive input or direction from the professor as a threat to their ownership of the project. As such, they tend to take more responsibility for the process and outcomes of their work. They do this because they view success as getting their own ideas integrated into the design. Even though design involves using past projects as precedent and sometimes involves a great deal of input from the public, there is still a strong personal component to the project in that success is often measured by how well the designer brings everything together. The high achiever recognizes this about design and understands their role as designer. Thereby, the high achiever works very hard to maintain ownership and responsibility for bringing things together since the outcome will indicate their successfulness.

By contrast, the interviews indicate that low achievers avoid exercising ownership for the project. Moreover, since their goals and ideas for the project are often derived from the professor in the first place, they do not see the project as truly their own. In other words, it is not something that they do for themselves in order to learn but rather something that they do for the professor. The low achiever does this because they do not understand that the process of design requires personal commitment to achieve a set of goals, many of which belong to the designer. Particularly, those that influence self-regulated learning.

Searching for Design Information and Precedent

An examination of the interviews in terms of how high and low achievers engage in search for design information and precedent for their studio project indicates that high achievers are deliberate in their preparation and search for information (Figure 27). In this sense, searching for information and precedent are a function of goal setting. Since the high achiever has a better understanding of their own goals and more ownership for their project, they are clear about what they should be researching in order to get information that informs and supports their design. In addition to being specific about how they search, the interviews indicate that high achievers also utilize a variety of sources including newsgroups, precedent projects, base information, and other people (Image 5). The reason why high achievers do this is that they have learned that successful design involves good ideas, effective decision-making, and other factors, and that research

supplies the information necessary to address those factors effectively. In other words, by engaging in research, the high achiever knows that they have a better chance at finding possible solutions to their problem and developing those solutions into a fitting design.

DIFFERENCES AMONG HIGH AND LOW ACHIEVING STUDENTS "SEARCHING FOR DESIGN INFORMATION AND PRECEDENT"	
HIGH ACHIEVERS	**LOW ACHIEVERS**
HIGH: … I'm subscribed to a lot of different landscape architecture newsgroups. I check out a lot of projects. … I search for projects that have the same idea as mine… So I'll look at those and say all right what kind of things have they created and try to figure out why and see if that applies to mine. And, say, "well actually this would help my design, all right; I'll try and get this. Now what do I have to do to get here" and I'll sit down and I'll think out that process. Then, when and if I've accomplished that maybe that puts me to a new step or a new thought I wouldn't have thought of originally without looking at the other impressive projects. (5:2, p.3)	LOW: I just really researched the site and the community. (4:6, p.8) *INT: How did you research the site and community?* LOW: Just do a lot of things that professor provided and like the photography, maps, news articles of where they're going, meetings with the community. (4:6, p.8) LOW: I guess what has challenged me is what I haven't been able to do. It challenges your mind, because of the resources you don't know how to find and you don't know how to go and get that information. I think that has really hampered the design. (4:6, p.7)
The high achiever researchers in a deliberate and self-motivated way in order to find for themselves information that is relative to their project.	***The low achiever relies on the materials provided by their professor and is often unclear about how to find other information relevant to their project.***
HIGH: I started on the foundation, you've just got to build it up. (5:2, p.11) HIGH: The foundation is just getting base information, understanding base information, seeing what you can do with it, seeing where the gaps are, trying to fill them in, and then you can actually start interpreting that information, turning it towards what you want it to be in the end. And sometimes that, in looking at that information what you want it to be changes, but it's still an informed decision and from there you can go on and start doing some basic design and doing that basic design you will come back to more problems and go backwards. And so it's always looping around. The final product is never really final; I've definitely found that out. (5:2, p.11)	*INT: You mentioned finding other peoples projects and what they've done, where do you find these?* LOW: On the internet, basically any form of projects you can just look at. (4:6, p.2) *INT: Do you do that a lot – go and look at other projects?* LOW: I wouldn't say I do it enough, I do it some to just get started. I think one of the main problems with me is that I really don't have the skill to find like I want to. I think the internet is kinda hard to find like the kind of things you want to find, certain types of designers and certain types of projects you could relate is hard. I think the main problem for students trying to find other projects is that there is just no immediate resources and it takes too long to find stuff like that in magazines and it seems like at the library there aren't many projects you could review in terms of landscape architecture. (4:6, p.3) *INT: How did you find these resources in the past?* LOW: I would say I really don't know, I just basically look on the internet because I don't have subscriptions to magazines… So personally, I think its difficult to find these things. (4:6, p.3) *INT: When you go to the library what do you do there?* LOW: I just type in a designers name or look for books that teachers and other students turn me on to. (4:6, p.3)
The high achiever views research as an ongoing process that informs design in specific ways as it evolves.	***The low achiever is less specific about their needs and researches in a general, somewhat random fashion.***

Figure 27 - Differences Among High and Low Achievers – "Searching for Design Information and Precedent": Shows how high and low achieving students differ in terms of the way that they go about researching their projects. Findings shown in boldface and italics.

The interviews indicate that low achievers, by contrast, rely on their professors to direct their research efforts and to provide them with information about the projects. Since the low achiever has less ownership and clarity in terms of the project's scope and goals, they must rely on the professor for assistance. The interviews indicate that low achievers use trial and error and random approaches that usually focus on using the internet as the primary source of obtaining information. The reason why low achievers do these things is because the do not understand how to find information or know the value of it. A lacks of goals makes it difficult for the low achiever to know what to look for in terms of research and how to know when they have found something useful. Thus, because they do not understand the how to find supportive information or understand its role in the design process, they are unlikely to engage in researching and thus rely on their professors for ideas and information.

Image 5 – Searching for Design Information: Students working together to find precedent for their projects.

Time and Time Management

An examination of the interviews in terms of how high and low achievers manage their time and projects reveals that high achievers are project-focused in terms of time management and planning. Thus, high achievers emphasize quality and competency over appearance (Figure

28). They do this because they understand that learning in a studio and quality design is not a representation of the look and feel of the drawings in the end but how competent the design and the designer are. This means that the high achiever must make sure they have the time to address all of the important issues related to the design. As a result, the high achiever breaks down the project into manageable steps and tasks (Image 6). Then, sets goals that help them achieve each task. The reason they do this is that they have likely had success doing it in the past and that they realize that a complex problem is not solved in one big piece but rather through progressive steps.

DIFFERENCES AMONG HIGH AND LOW ACHIEVING STUDENTS "TIME MANAGEMENT"	
HIGH ACHIEVERS	**LOW ACHIEVERS**
HIGH: I'll say by Friday I want to have this path system finished and by Monday I want to have this drawing done so I can present it. And, I'll say, by this last class, or by Monday, I wanted to have all my houses laid out… but I didn't because it took a lot longer than we thought. So now I'm gonna work on that and try to get it done by tomorrow. I mean, if I don't have something done by the time I want to get it done, then I just have to stay extra and get it done before the next class so I don't fall behind. (3:3, p.9)	*INT: Do you set specific work times or amounts of time needed to work?* LOW: I would just say amounts of time needed to work. (4:7, p.3) *INT: Do your prioritize?* LOW: Umm, for the most part no. Maybe just, you know the assignments and the projects I know are most important and will effect my grade more and have a bigger impact on my grade I will definitely try to get to those first. And just try my best to get it all done. (4:7, p.3)
The high achiever breaks their projects down into smaller, manageable pieces and goals based upon the design and the project's emerging needs.	***The low achiever prioritizes their project based upon how it effects their grade instead of what facilitates project completion and effective design.***
HIGH: I think… you have to put in more time than is required. And I know, studio – well, when I came into LA I thought I would only have to go to class, do some work in class and turn in projects but I think you have to put in extra time. If someone else is going home, it's tempted to go home. But I think if you stay and work even if you're stuck, you'll push through it and then you'll be happy that you stayed there for an extra hour or two hours or three hours. And even if it's hard to stay in studio, I think that when I do my best work – is when I've been there for a while and I can really focus on it. (3:3, p.10)	LOW: It takes a lot of weeks of just staying in longer that you normal would do. Its just like, I guess, pushing your body to the limits. Just like going on adrenaline. You just stay up here, and you just keep working, because you know you have to get something done. (4:6, p.10) LOW: The final design. (4:5, p.18) *INT: What does that entail?* LOW: Staying up all night tonight. (laughs) (4:5, p.18)
The high achiever puts in additional time throughout the project as needed in order to improve the quality of their work.	***The low achiever works hardest at toward the end of the project in order to meet the assignment deadline.***
INT: How did you learn how to game plan projects? HIGH: From my parents. It's a planning strategy to get me throughout high school and middle school when I was writing papers and all that type of stuff. That's definitely impressed upon you. (5:2, p.10)	LOW: The project has… challenged me to come up with my own schedule and my own, like my own goals, you know, because there is nobody to tell me other than Professor X… that this is what I need to have done by the first semester. (5:6, p.12)
The high achiever uses past experiences as a basis for how they organize and plan a project.	***The low achiever recognizes the need for planning but fails to see how their past experiences can be used as a basis for their current planning.***

Figure 28 - Differences Among High and Low Achievers – "Time and Time Management": Shows how high and low achieving students differ in terms of how they view time management. Findings shown in boldface and italics.

The interviews indicate that low achievers, by contrast, are deadline-focused and thereby emphasize completion and appearance over quality and developing competency. They do this because they are unaware that underlying the drawings should be a competent and functional design. The low achiever does not realize that what looks better to the professor is not actually how things appear, but how they function. As a result, the low achiever focuses on the appearance of the work and the final plans, thereby exerting the most effort towards the end of the project during production rather then earlier during planning. The lack of planning make knowing how to manage their time and complete their projects less clear. In addition, the interviews indicate that low achievers are often unsure about how much time it takes to complete each task related to the project and therefore set aside a block of time from which they do as much work as possible. This happens because of a lack of practice setting goals, planning, and managing time that arises out of the low achievers confusion about what the professor really is expecting to see. Underlying each of these issues relative to the low achiever and time is the inability to see design as a process and that process takes time. Thus, a better understanding of design as a process involving the evolution of ideas will enable the student to manage his or her time better.

Image 6 – Goals and Time Sheet: Student records goals and then keeps track of time in order to manage project and goals.

Making Connections to Non-studio Classes

An examination of the interviews in terms of how high and low achievers make connections between what occurs outside of studio with what happens inside the studio indicates that high achievers recognize that information from outside studio, such as in history or theory courses, can serve as a basis for many of their decisions regarding their studio project (Figure 29). As such, high achievers are inclined to integrate information that is applicable to their projects regardless of its origin. In addition, they are likely to be on the lookout for information even when apart from the studio setting since they are clear about what they are needing in order to inform or support their work (Image 7). The reason why high achievers engage in these behaviors is that they have a higher level of understanding of the complexities of design and are better able to make connections between different elements and aspects of design.

DIFFERENCES AMONG HIGH AND LOW ACHIEVING STUDENTS "MAKING CONNECTIONS TO NON-STUDIO CLASSES"	
HIGH ACHIEVERS	**LOW ACHIEVERS**
HIGH: … things I am hearing in other classes and trying to relate that to what I'm doing… especially when you're coming up with your own project statement.... Like I drew from Walter Hood and how he reveals landscapes…And like I drew directly from that to start formulating what I wanted to do in that place [do on the project]. (4:2, p.10)	*INT: Do you ever bring the stuff you learn in those outside classes into studio?* LOW: yeah I try to but ah its not you know that easy I guess. (4:7, p.11) *INT: Why not?* LOW: Just because studio is so different from any other class because you know, you're doing actual design work and you're drawing and you're doing everything you're doing in studio where with every other class you feel like your just basically learning information and writing papers and doing assignments and it doesn't really compare to studio, and what you do in studio. (4:7, p.11)
The high achiever sees a connection between non-studio courses and their current work in studio and attempts to integrate the two where possible.	***The low achiever sees their current project as something altogether different than anything occurring outside of studio and thereby misses the opportunity to use information from other classes in their studio work.***
HIGH: There is always scheduling that's a problem, you know, especially with other courses. (5:2, p.10) HIGH: Just kind of get a head, as soon as something is given, as soon as a project is given, think about how to do it, if you are not going to sit down and do it right then, get the game plan in your head, otherwise if you have to start thinking about that, you know, a couple of nights before it is due, it's not like writing a paper, when you're doing a project it's a whole lot more intense. (5:2, p.10)	*INT: Why did it [studio] start out slow?* LOW: I thought it was the way … like we had plenty of time to do the projects… (4:5, p.1) LOW: …and right now I guess we are in the hurricane winds. (4:5, p.1) LOW: …out in the eye (4:5, p.1) *INT: So you're describing studio as kind of a hurricane wind, rigorous, why are you giving it such a dyer description?* LOW: I mean, again it could be related to the way I'm thinking about all the other assignments I have due… (4:5, p.1) LOW: …I mean the snowstorm was a blessing (4:5, p.2) *INT: Why?* LOW: …my paper that was due at 1:00 is now due tomorrow at noon. (4:5, p.2) LOW: Well, I could have finished it. I basically had finished, but it was sub-par, it was not as good as it could have been. I felt like, we should have had more time anyway… (4:5, p.3)
The high achiever recognizes possible conflicts between non-studio work and the complexity of the studio project and thus puts a priority on getting an early start on the project.	***The low achiever disregards possible conflicts between studio and non-studio courses and thereby resolves to persevere and settles for sub-par quality.***

Figure 29 - Differences Among High and Low Achievers – "Making Connections to Non-Studio Classes": Shows how high and low achieving students each view the demands of non-studio classes. Findings shown in boldface and italics.

The interviews indicate that low achievers are unable to see connections between what they learn in non-studio courses and in studio. As such, they struggle to apply what they have learned in other classes to their current work. The reason for this inability to synthesize disparate

concepts is the lack of insight in terms of the relevance of their past experiences. The interviews also indicate that low achievers do not effectively anticipate conflicts within their schedules and thereby fail to make adequate preparations and plans. As a result, low achievers find themselves overwhelmed and frustrated by the amount of work that they perceive to have been compounded onto them by their professors. A factor in this behavior is self-efficacy. If students have not had much success in the past planning their projects, they are less likely to put much effort into it in the future. This undermines their efforts to deal with the demands of life outside of studio.

Image 7 – Student Connecting Courses: student writes a paper for a non-studio courses while working in studio so that he can try to integrate the non-studio assignment with his studio project.

Self Sub-Processes

"Self" sub-processes refer to processes such as self-efficacy, self-monitoring, and self-judgment. An examination of the interviews in terms of how self-efficacy influences high and low achievers indicates that high achievers are willing to take risks and try new things in regards to their studio project (Figure 30). These efforts often improve the student's self-efficacy even when the tasks are difficult and the outcome leads to additional work. They do this because they believe that doing things for themselves improves their capability to engage in similar tasks in the future, thereby providing them with more ownership and control of their projects. The reason

for this belief is because they have had success in the past and that they know that to be an effective designer they cannon rely on others to tell them what to do. In addition, the high achiever understands that the process of design is not easy and thereby expects some difficulties to arise. In fact, dealing with difficulties effectively, boosts the student's self-efficacy, making it easier to deal with similar difficulties in the future.

The interviews indicate that low achievers, by contrast, are less likely to view difficulties that they encounter during learning as opportunities to enhance their capabilities even when they recognize that their inability undermines their project. As such, they fail to improve their self-efficacy and are even less likely in the future to engage in those tasks that they feel they are incapable of completing. The low achiever's lack of knowledge in terms of designing and how learning occurs in studio undermines their willingness to become actively involved in their learning, thus diminishing their chances for improving their self-efficacy.

DIFFERENCES AMONG HIGH AND LOW ACHIEVING STUDENTS "'SELF' SUB-PROCESSES"	
HIGH ACHIEVERS	**LOW ACHIEVERS**
HIGH: And I felt like that [finding information for herself and learning from it] was really empowering because I did it all on my own and I got all this information and it made me feel really good that I could do that (smile and laugh). In addition, I did all of these other site analysis along the stream and tried to go more in-depth about it. And looked at environmental factors. And I didn't get as much as I proposed to get but there were certain restrictions that I didn't know I would run into. And I learned that in making my proposal when I was writing it, I was like man this is a lot of stuff, I didn't know if I really can get all this done –I wanted to. And then being able to get done so much really made me feel good. It taught me that I could do it. (4:1, p.8)	LOW: I guess what has challenged me is what I haven't been able to do. It challenges your mind, because of the resources you don't know how to find and you don't know how to go and get that information. I think that has really hampered the design. (4:6, p.7) INT: *How did you find these resources in the past?* LOW: I would say I really don't know, I just basically look on the internet because I don't have subscriptions to magazines. But if you read enough you would actually see all these projects and you'd learn more. So personally, I think its difficult to find these things. (4:6, p.3)
The high achiever's self-efficacy improves during learning, even when learning efforts are difficult, thereby improving the likelihood that they will attempt similar tasks in the future.	***The low achiever feels that they do not have the capability to complete project tasks effectively, thereby undermining their self-efficacy and willingness to engage in those tasks in the future.***
HIGH: … it [the design concept] comes from a lot of trial and error, really to lay it down on paper and then look at it and see if it works and discuss, you know, talk with your fellow classmates. And you know, if that doesn't really work, so you will have to redo that, and you, this could be better, you know, just kind of nit pick edit and every once-in-a-while you know, maybe you have changed it so much in-between that that whole structure doesn't make sense any more, so you change it again. You know, for me, it's a whole lot of revision, you know. (3:2, p.5)	LOW: …the thing I realize now is I shouldn't have put so much time into it because…he [the professor] came back and we talked again after I had done that and he came up with some more issues that he thought... (3:7, p.9) INT: *So, what did you learn from that?* LOW: Talk to him first, definitely. (3:7, p.10)
The high achiever generates multiple ideas and monitors their progress based on feedback from varied sources.	***The low achiever is reluctant to generate too many ideas since they lack the ability to monitor the appropriateness of their work and thereby risk making mistakes and wasting time.***
INT: *So, how do you know if you're doing the right thing?* HIGH: Like details and sections… and, taking one area and enlarging the scale and making it just a different scale to, umm, show different relationships in the drawing or how that one space is... different from others. Maybe, for example, doing a detail of that space versus than doing a detail of a dense space. And showing how and why they're different and why it would work here as opposed to another location. By doing different types of drawings. (3:3, p.7)	LOW: Many of the professors, I don't feel like I have anything to show them, so I mean, I don't, I feel like they don't want me to show them anything because they don't show an interest in meeting with me. It goes both ways though, I haven't tried to meet with them. (5:7, p.11)
The high achiever uses their drawings and discussions as a basis for judging their progress from a variety of viewpoints.	***The low achiever does not generate sufficient drawings and work to discuss and therefore lacks the confidence to seek feedback that supports self- judgment of progress.***

Figure 30 - Differences Among High and Low Achievers – "'Self' Sub-Processes": Shows how high and low achieving students differ in terms of their self-efficacy, self-monitoring, and self-judgments. Findings shown in boldface and italics.

In terms of self-monitoring, the interviews indicate that high achievers generate multiple ideas early in the project in order to increase the amount and variety of feedback they receive (Image 8). The reason high achievers do this is because they know that multiple ideas are necessary component of design. As a result, of generating multiple ideas, they are able to self-monitor their progress more effectively and thus modify their designs in order to continue moving towards their goals.

Image 8 – Student Self-Monitoring: student generates multiple ideas and uses them as a basis for receiving feedback relative to goals and emerging ideas.

The interviews indicate that low achievers' monitoring capabilities are undermined by their reluctance to generate too many ideas since they feel that this may be a waste of time if they are not compatible with the professor's expectations. The low achiever has not figured out that the professor's real expectation is for the student to develop a competent project derived from a process that involves generating multiple ideas. Furthermore, without understanding design and the components of design, it is likely that the low achiever is not monitoring aspects of their project that are truly relevant for developing a successful project.

In terms of self-judgment, the interviews indicate that high achievers use tools such as drawing to facilitate monitoring and feedback. This finding illustrates a key difference between

design learning and other forms of learning in that drawing rather than quizzes, papers, or discussion are used as the primary means by which goals are monitored, judged, and modified. In this way, the process of drawing results in self-judgments of progress. Thus, the high achiever learns and catalogues strategies and behaviors that help him or her maintain progress towards goals. The low achievers, however, are often unable to evaluate their effort since they undermine their ability to monitor their progress by failing to show other people their work. The reason why high achievers are more able to attribute value to their work than low achievers is that they have a better understanding of what design should and should not be. Furthermore, by using this knowledge to set goals and engage in monitoring their progress they are more likely to get the information necessary to make a self-judgment. The high achiever understands that design is judged by oneself as much as by anyone else, especially in the planning and development stages. Thus, the high achiever is more likely to engage in behaviors that will provide a foundation for self-judgment.

Design Processes

An examination of the interviews in terms of the way that high and low achievers view the process of design relative to their studio projects indicates that high achievers often choose for themselves what they need to learn in order to improve their deficiencies (Figure 31). In this way, the high achiever tends to see design as an open-ended process that they can to some degree control, rather than a recipe that they follow. This often results in trying new things and taking risks. In doing so, they tend to use a methodological process that has a set of criteria in order to ensure that what they are doing is beneficial (Image 9). The high achiever does this in order to improve their capabilities and self-efficacy so that they will be able to free themselves to set new goals and work more independently. The reason why the high achiever engages in these behaviors is because they understand that design involves risk taking in order to learn new things. Moreover, they realize that risk taking occurs in response to criteria and goals set as a function of a broader process of design.

DIFFERENCES AMONG HIGH AND LOW ACHIEVING STUDENTS "DESIGN PROCESSES"	
HIGH ACHIEVERS	**LOW ACHIEVERS**
HIGH: … I hadn't seen a lot of linear LA projects… most of landscape architecture work is in a big block or some ameba shape. And, I saw a project that was just in a long line and I wanted to do it. The linear site was the challenge… it was, how to work with a narrow corridor… And, you got to understand how to get outside of that because you don't have to… since I am choosing my own site and I got my own boundaries, I needed to look beyond just this little, linear tract. And I could look, you know, to site lines and things like that. And how to pull the neighborhood into this little tract. (4:2, p.14)	LOW: … I think rendering is going to be a big part of… this project for me…Because he [the professor] has been on our cases this semester about rendering… So that's one of the goals for me, personally in this project.... (3:7, p.5) *INT: And why is that your goal?* LOW: Because he's been on all of our cases about it all semester... (3:7, p.5)
The high achiever chooses to develop his or her knowledge of process by experimenting with new project types that they feel the need to know more about.	***The low achiever chooses to focus their goals and process development on what they perceive their professor wants them to know more about.***
HIGH: I drew everything together in one drawing. I traced it and I laid it over and I drew it again. I looked at it to see, umm… like I would look at the road pattern. To see if that… there was access to all parts of the site and the same with the pedestrian patterns. And to see if the pedestrian pattern WAS the dominant way to get throughout the site. And I just kind of listed requirements that I thought I need to have. And I made a checklist to see if that was really what I did. And then I went back and fixed things that I thought didn't fit with my list of requirements. (3:3, p.6)	LOW: I don't feel like I spent as much time on it, tonight is like, I'm getting ready to stay up all night, spend a lot of time on it tonight, we have to present tomorrow…so the biggest challenge is tonight. I mean I have most of my design issues resolved. But I guess I need to see it in 3-D. I haven't finished my model. I need to think about it more… and then from that develop the drawings …well, the actual design. I have my design issues pretty much solved but… *(long pause)* for now I guess they are solved... (4:5, p.11)
The high achiever use a methodical approach to designing with specific steps and criteria that help ensure an appropriate design.	***The low achiever sacrifices methodology by waiting to the last minute to work out their design issues.***
HIGH: I think just growing, like, open for ideas and not staying on the static level of work. I like seeing people that have changed, like they have experimented with something and done something different, I think that is being successful. Even if it didn't come out as well as you liked it, or it didn't look at good as what you like, but you tried and you learned something from it, I think that's being successful. Trying something different, I don't like to see someone that's completely doing the same thing over and over again. (4:3, p.10)	LOW: …of course I had to talk to my professor first then, to see, if you know, my ideas were gonna work, if these ideas were feasible. And for the most part she liked my design program and, you know, told me a few things I needed to do, you know, those modifications we were talking about earlier. And I made those, and still not in the final stages of my design but, um through talking to my professor, that really helps to you know, know what I need to do to make a successful design. (4:7, p.8)
The high achiever shows a willingness to learn and grow by trying new things.	***The low achiever needs approval before trying new things.***

Figure 31 - Differences Among High and Low Achievers – "Design Processes": Shows how high and low achieving students differ in terms of the processes they use to design. Findings shown in boldface and italics.

The interviews indicate that low achievers by contrast want approval from their professors before trying new things even when they are aware that they need to improve in an area. This reinforces the low achievers dependence on the professor and discourages risk taking that could lead to improved self-efficacy and greater independence. The reason that the low achiever shows a reluctance to try new things is because they view design as a recipe given to them by their professor. The low achievers goal is to follow the recipe as closely as possible. The low achiever may feel that deviating from the recipe may result in wasting time making mistakes. As a result, the quality of their projects suffer since they are only addressing deficiencies that have been identified by the professor's recipe.
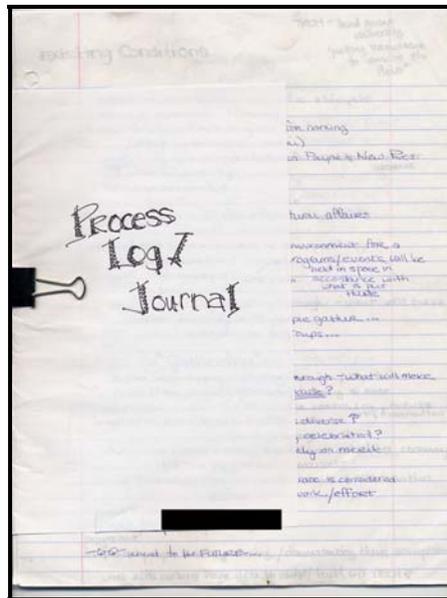
Image 9 – Process Log and Journal: student keeps track of his or her process in order to use it as a reference in the future and to understand how they design.

Goals

An examination of the interviews in terms of the way that high and low achievers integrate goals into their studio projects indicate that high achievers tend to set goals for themselves that are oriented towards building and demonstrating their knowledge and competencies relative to their studio project (Figure 32). The interviews indicate that high achievers are willing to modify their goals in response to feedback that they receive and the ongoing needs of the project. The reason why they do this is that they understand that in design

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there is an ongoing relationship between goals, feedback, and the changing needs of the project. They know that addressing this relationship forms the basis of demonstrating their learning and competency in studio. Because of addressing this relationship, the high achiever maintains ownership for both their goals and the methods that they use to attain them.

DIFFERENCES AMONG HIGH AND LOW ACHIEVING STUDENTS "GOALS"	
HIGH ACHIEVERS	LOW ACHIEVERS
INT: How did you narrow down, how did you pick the goals that you wanted to address? HIGH: I think just whatever we were interested in, um, before the concept, like whatever we directly wanted to work with, like if you wanted to work with the street life, or something like that then you would directly face like, what the street issues were, the connections of the streets and things like that, so that's how you narrow it down. (4:3, p.3)	LOW: …throw out a lot of ideas just so you can get a lot of feedback. So you'll be able to inform your work in a way that pleases the professor, they either tell you your going on the right track or not going on the right track. (4:6, p.3)
The high achiever sets goals for themselves that address the project and the design while building learning competencies.	**The low achiever sets goals intended to please the professor and address the professor's goals while attempting to appear competent.**
INT: Did your goals ever with your project? HIGH: Yep. (4:3, p.6) INT: What changed them? HIGH: Um, just like when you are on a site you start to see more than what was there to begin with so, before you thought well this is a broad idea and then you get down to the nitty gritty and you are like, well this is going to have to change because you find something more, you know. (4:3, p.6)	INT: It sounds to me that based on what you just said that you don't feel like what you're doing is the right thing? LOW: No, I don't. (5:7, p.5) INT: Are you still going to do it? LOW: Yeah. (5:7, p.5)
The high achiever changes his or her goals based upon the evolution of the project and the feedback that they receive from others.	**The low achiever is unwilling to changes his or her goals even when they are aware that their current direction is ineffective.**
HIGH: …in the past I can say I felt most successful when I presented a project and I could find a reason for every decision I made. That would be success to me. Not whether my professors liked it, but if they asked me a question of why I did something, that I could say well I looked into that and this is why. That's my ultimate goal for this project. (5:1, p.9) HIGH: … I think a successful studio is being able to think of things your own way…. being able to think more independently or being able not to worry so much about, is my project is better than someone else's? People who have grown in studio were disappointed with the grades they got but they got a whole lot more out of studio than some people who got A's by just producing what the professor wanted. (3:3, p.10)	INT: What is success in studio? LOW: I guess it can be a number of things. But its ultimately, at least the way a lot of people judge it, it's the letter grade. (4:5, p.21) LOW: …you know the assignments and the projects I know are most important and will effect my grade more and have a bigger impact on my grade I will definitely try to get to those first. (4:7, p.3)
The high achiever's goal is to demonstrate learning and knowledge through drawings and presentation.	**The low achievers goal is to attain a letter grade that they believe implies that they have learned.**

Figure 32 - Differences Among High and Low Achievers – "Goals": Shows how high and low achieving students differ in terms of the way that they engage in professor interaction. Findings shown in boldface and italics.

Low achievers, by contrast, base their goals upon their perceptions of what their professor expects from them. The reason why they do this is a lack of self-efficacy to set goals for themselves that itself comes from a lack of understanding about the role that goals play in design. Particularly, the relationship between the designer's own goals and the project. As a result, they attempt to interpret what their professor wants them to do and then behave accordingly. This means that the low achiever is unlikely to adapt their goals to their own needs unless they are directed to do so by the professor. The result is inaction especially when their needs might seem at odds with the professors suggestions since that might be perceived as an affront to his or her experience.

Summary of Findings Related to Student Achievement Level

The examination of the interviews in terms of student achievement level and self-regulation reveals several important findings. Figure 33 summarizes these findings.

SUMMARY OF FINDINGS RELATED TO STUDENTS WITHIN BOTH ACHIEVEMENT LEVELS
Students, regardless of their year or achievement level, were generally consistent in terms of the issues that they talked about in regards to studio.
Students engage in SRL activities, behaviors, and strategies out of a need to address issues related to studio.
Even though high and low achievers use SRL to engage similar issues, they use different SRL activities, behaviors, and strategies to address those issues.
The reason high and low achievers engage in different SRL activities and behaviors is because of their understanding (or lack of understanding) of what design entails, and how one learns how to design in a studio.
SRL and design form a reciprocal relationship. SRL enable a student to engage in designing and designing requires SRL.
High achievement is a result of advanced knowledge that comes from the freedom to set goals beyond the basic requirements of the project. The freedom comes from the ability to reallocate cognitive resources away from learning how to design and gaining an awareness of effective SRL activities and redirecting them towards taking risks and learning new information.

Figure 33 - Summary of Findings Related to Student at Both Achievement Levels: Shows the results of the interview analysis in terms of student achievement level.

Together, the findings summarized in Figure 34 suggest that high and low achievers employ notably different approaches in terms of how they self-regulate their learning on studio projects. The primary reason why this occurs is that high and low achievers have different level of understanding about what design is and how one does and does not learn design in a studio.

SUMMARY OF SRL BEHAVIORS AND STRATEGIES ASSOCIATED WITH HIGH AND LOW ACHIEVING STUDENTS		
Studio Issues (Fig. 16)	**High Achieving Students**	**Low Achieving Students**
Working in the Studio	Takes the initiative to come to studio. Sees the professor and other students as sources of knowledge and feedback. Despite distractions, values studio as a source for receiving feedback that facilitates learning.	Sees the professor as an external regulator and motivator that should take the initiative to engage him or her. Sees the studio and his or her friends as distractions that diminish opportunities for learning.
Peer Interaction	Create meaningful relationships with other students for the purposes of influencing learning. Deliberate about who they interact with in order to seek the type of feedback that lets them know if they are progressing towards their goals. Seeks to improve his or her learning based upon deliberate interactions from advanced students.	Focuses on the outward appearance of the relationship with other students rather than the meaningful contribution the relationship can make to their learning. Does not discriminate about whom they interact with and are less clear about what they are looking for, depending on people around them to tell them what to do next. Recognizes the need for additional learning but takes no responsibility for seeking the knowledge on his or her own.
Professor Interaction	Views the professor as a partner and additional source of knowledge and feedback with whom they share their ideas and goals. Examines their needs and seeks help from those who are most experienced. Addresses the professor's most salient concerns but maintains ownership for their work by questioning both the professor's and their own thinking.	Views the professor as the sole source of knowledge and direction from which they receive their goals and define the scope of their projects. Defines their needs in terms of their class and who their professor is. Attempts to address all of the professor's concerns regardless of his or her own ideas and goals.
Idea & Concept Generation	Generates multiple ideas and develops them by eagerly talking with classmates and other people. Sets limits on the project and him or herself in order to make the project more manageable.	Generates one idea and reluctantly shares it with others in order to avoid having to modify it. Associates no limits with the project except for those set by other people.
Prior Learning & Experience	Uses what he or she learned from past projects as a foundation and guide for their current project. Translates their past experience into a growing body of knowledge from which they build advanced understanding.	Feels that they have no criteria to guide their present efforts since they lack the ability to see how their past experiences inform their current projects. Has difficulty communicating with the professor since he or she is unable to translate their studio experiences into usable professional knowledge.
Relevance, Motivation & Ownership	Sees the project as a beneficial learning experience that prepares them for the future. Attempts to integrate freedom and personal choice into the project in order to enhance motivation. Want responsibility for his or her project and resists excessive direction that limits the student's ownership for the work.	Unable to see the value in the project and sees it as a busy work. Motivated by less freedom and personal choice instead attempting to be directed externally. Takes little ownership for the project instead expecting that since the project belongs to the professor then he is released from any responsibilities.
Searching for Design Info./ Precedent	Researchers in a deliberate and self-motivated way in order to find for themselves information that is relative to their project. Views research as an ongoing process that informs design in specific ways as it evolves.	Relies on the materials provided by their professor and is often unclear about how to find other information relevant to their project. Is less specific about their needs and researches in a general, somewhat random fashion.

Time & Time Mgmt.	Breaks their projects down into smaller, manageable pieces and goals based upon the design and the project's emerging needs. Puts in additional time throughout the project as needed in order to improve the quality of their work. Uses past experiences as a basis for how they organize and plan a project.	Prioritizes their project based upon how it effects their grade instead of what facilitates project completion and effective design. Works hardest at toward the end of the project in order to meet the assignment deadline. Recognizes the need for planning but fails to see how their past experiences can be used as a basis for their current planning.
Making Connections with Outside Courses	Sees a connection between non-studio courses and their current work in studio and attempts to integrate the two where possible. Recognizes possible conflicts between non-studio work and the complexity of the studio project and thus puts a priority on getting an early start on the project.	Sees their current project as something altogether different from anything occurring outside of studio and thereby misses the opportunity to use information from other classes in their studio work. Disregards possible conflicts between studio and non-studio courses and thereby resolves to persevere and settles for sub-par quality.
Self Sub-Processes	Self-efficacy improves during learning, even when learning efforts are difficult, thereby improving the likelihood that they will attempt similar tasks in the future. Generates multiple ideas and monitors their progress based on feedback from varied sources. Uses their drawings and discussions as a basis for judging their progress from a variety of viewpoints.	Feels that they do not have the capability to complete project tasks effectively, thereby undermining their self-efficacy and willingness to engage in those tasks in the future. Is reluctant to generate too many ideas since they lack the ability to monitor the appropriateness of their work and thereby risk making mistakes and wasting time. Does not generate sufficient drawings and work to discuss and therefore lacks the confidence to seek feedback that supports self- judgment of progress.
Design Processes	Chooses to develop his or her knowledge of process by experimenting with new project types that they feel the need to know more about. Uses a methodical approach to designing with specific steps and criteria that help ensure an appropriate design. Shows a willingness to learn and grow by trying new things.	Chooses to focus their goals and process development on what they perceive their professor wants them to know more about. Sacrifices methodology by waiting to the last minute to work out their design issues. Needs approval before trying new things.
Goals	Sets goals for themselves that addresses the project and the design while building learning competencies. Changes his or her goals based upon the evolution of the project and the feedback that they receive from others. Goal is to demonstrate their learning and knowledge through drawings and presentation.	Sets goals intended to please the professor and address the professor's goals while attempting to appear competent. Is unwilling to changes his or her goals even when they are aware that their current direction is ineffective. Goal is to attain a letter grade that they believe implies that they have learned.

Figure 34 - Summary of SRL Behaviors and Strategies Used by High and Low Achievers: Shows the different strategies that high and low achievers in landscape architecture use to self-regulate their learning on design projects.

CONCLUSION

Landscape architecture students learn skills and knowledge while working on design projects in studio. Most people argue that the essential thing these students learn in studio is how to design. Learning how to design can be a frustrating and confusing process since designing itself involves complex problem solving, creativity, numerous variables, and other subjective factors that for some students are difficult to understand. In addition, some students think that design is a recipe that the designer simply follows and do not realize that design is an open-ended process involving an evolution of ideas controlled mostly by the designer. For these students, failing to grasp the process of designing can challenge their willingness to stay motivated and actively engaged in the studio project. The result is diminished goal setting, monitoring, and other aspects of self-regulated learning. Without an adequate understanding of

how to design and use of self-regulation, students are unable to get the most out of their design projects and their opportunities for achievement are reduced.

On the other hand, for students who are more sophisticated in their understanding of design, the studio project allows them to become deeply involved in a problem-solving process that is highly personal and rewarding. These students are aware of the role that self-regulated learning plays in their design project and use it to make the project their own through goal setting, motivation, self-monitoring, and other features of self-regulated learning. By joining the design and self-regulation processes into a cohesive, reciprocal relationship, the student becomes more deeply engaged in both. The result is often higher achievement and optimal learning.

Findings from this study suggest that the reason why some students are able to experience higher achievement and more optimal learning is that they know more about how to design and what it means to learn in a design studio. This knowledge frees the student to use the project as a vehicle for learning things other than how to design. In other words, when a student understands how to design they are free to learn other things, including additional SRL. This form of freedom on a design project provides students the opportunity for exploring alternatives, taking risks, practicing new skills, and ultimately greater learning and achievement. Thus, optimal learning and achievement in studios is based upon one's understanding of how to design and concept of learning in a landscape architecture studio. For professors, this means that considering a student's level of understanding prior to attempting a learning intervention is a key first step in determining the appropriate form, time, and amount of added instruction that each student needs relative to design and self-regulated learning.

The next chapter of the dissertation, "Summary and Implications," describes additional implications related to the study findings and discusses how studio pedagogy, and even the concepts of self-regulated learning and problem-based learning, might be improved if not transformed by these implications.

CHAPTER 5 – SUMMARY AND IMPLICATIONS

This chapter discusses the dissertation's results in the context of previous studies and research, as well as the implications of the results for landscape architecture education. This chapter has five sections. The first section summarizes and discusses the study's findings. The second section discusses the implications of the study findings relative to various aspects of teaching and learning in landscape architecture education. The third section presents a set of guidelines, based upon the study's findings, intended to provide studio professors suggestions regarding how they might consider intervening in their students' learning and achievement on studio projects. The fourth section discusses the study's limitations and provides suggestions for improvement. Finally, the fifth section discusses several avenues for future research and concludes the study.

SUMMARY AND DISCUSSION OF THE MAJOR FINDINGS

This study investigates the role of student self-regulated learning (SRL) in the landscape architecture studio. The primary goal of the study is to provide studio professors with information that helps them understand the reciprocal relationship between SRL, landscape architectural design, and the studio environment, so that they can use this knowledge as a basis for enhancing their students' learning and achievement. Several interrelated research questions guide the study. Interviews with 21 landscape architecture students were conducted in order to obtain a set of highly descriptive data. The data was analyzed using an open coding process. Analysis of the interview data reveals several important findings relative to the study's research questions. Figure 34 summarizes the research questions and the study's major findings.

SUMMARY OF MAJOR STUDY FINDINGS	
Research Question	**Major Finding**
What types of self-regulated learning do students in landscape architecture studios engage in?	Landscape architecture students engage in a wide variety of SRL. However, study findings suggest that SRL behaviors and activities fall into two broad types: design-related and studio/environmentally-related. Students engage in SRL behaviors in response to issues related to the process of designing the studio environment.
How do landscape architecture students self-regulate their learning and performance on studio projects?	Landscape architecture students self-regulate their learning on studio projects through a process of engaging in design, then using SRL to address issues that arise during design, then generating more design issues that require additional SRL, and so on. This process is both reiterative and reciprocal. The issues that arise depend on several factors including the student's understanding of how to design; pressure from external, non-studio factors; and an awareness of possible self-regulated activities and behaviors.
How does self-regulated learning on studio projects vary by academic level of the students?	Landscape architecture students emphasize different issues in each year of the program. The issues that students emphasize are a reflection of their understanding of how to design and what it means to learn in a studio. Since students in each year have different understandings of what designing entails, they use and engage in SRL differently.
What factors are important in a student's ability to engage in self-regulated learning?	A landscape architecture student's capability for engaging in SRL is limited by his or her awareness and understanding of how to design, how to learn in a studio, and how to use effective SRL activities and behaviors. Once a student becomes aware and understands these three things, then addressing specific factors within design and studio such as goal setting, monitoring, and modifications become important in a student's ability to engage in both SRL and the design project.
Why do some students in the studio engage in self-regulated learning and others do not?	Since SRL activity and behavior is initiated in response to issues and needs that arise while working on the design project, only those students who recognize the needs associated with designing and learning in studio will feel the greater need to engage in self-regulation. In turn, SRL helps students identify project-related needs and issues that they should address through design, thus leading to greater engagement with the design project.
What is the relationship between self-regulated learning and student achievement?	High achievement in a landscape architecture studio is a result of advanced knowledge that comes from the freedom to pursue additional issues and learning beyond the basic requirements of the project. The freedom comes when a student attains the knowledge and expertise to shift cognitive resources away from learning how to design and gaining an awareness of effective SRL activities and redirects them towards risk-taking, personal interests, and learning new information.
What types of intervention strategies can educators utilize to enhance their students' self-regulated learning?	Studio professors can attempt to use a variety of intervention strategies to enhance their students' SRL. While this study did not test the validity of any particular intervention strategy, findings suggest that since the problem of poor performance and engagement arises out of a lack of knowledge relative to design and effective SRL, the most important intervention strategy is ensuring that students learn the basics of design before moving on to more advanced issues. This and other intervention strategies are discussed in more detail later in the chapter.
How do the study's findings contribute to the existing body of knowledge in the area of self-regulated learning?	The study indicates that SRL and design have a reciprocal relationship whereby one can either improve or diminish the other depending on a student's level of knowledge and awareness. Previous studies have rarely explored this type of relationship between SRL and a particular subject. Moreover, since SRL researchers have never studied landscape architectural design, the nature of this relationship becomes even more intriguing. Findings related to how SRL differs in landscape architecture studios should present new challenges for SRL researchers to consider and explore.

Figure 35 - Summary of the Study's Research Questions and Major Findings.

Discussion of Major Findings

  Landscape architecture students engage in a wide variety of SRL. Study findings suggest that SRL behaviors and activities fall into two broad types: design-related and studio/environmentally-related. SRL literature does not specifically speak to the process of design or landscape architecture as such, instead definitions and research tend to focus on basic "tasks" that could be associated with any field and then uses this generalization as a backdrop for applying or testing a particular concept of SRL. Corno and Mandinach (1983) and Corno's (1986) definition of SRL demonstrates the universal nature of many SRL definitions. They say that SRL refers to the deliberate planning and monitoring of the cognitive and affective processes that are involved in the successful completion of academic tasks (Corno and Mandinach, 1983; Corno, 1986). This study suggests that there is a more specific quality to SRL, especially in landscape architecture studios.

  For example, Zimmerman's (1998) three-phase model of SRL refers to the process of SRL as involving task analysis, task skills, and task strategies. In addition, Hadwin and Butler (2000) have identified five facets of studying tasks and four phases of self-regulated studying. Like Corno's definition before, these and other previous SRL studies, tend to apply a somewhat generic label – tasks – to the activities associated with any area of study. Findings from this study suggest that the unique and process-oriented nature of the tasks associated with landscape architectural design are significant in terms of how and to what degree SRL occurs. Therefore, while findings from this study tend to support the important role that SRL plays in terms of the tasks and assignments a student must address in any field, they also emphasize the need to recognize that tasks are not generic, especially in a design-oriented field whereby their uniqueness and complexity place stronger demands on SRL.

  SRL research has focused a great deal of effort on exploring the role that a student's learning environment plays in his or her SRL. The study findings generally support claims made by people such as Bandura (1977), who say that "by arranging environmental inducements, generating cognitive supports, and producing consequences for their own actions, people are able to exercise some measure of control over their own learning" (p. 13), and Zimmerman (2001) who suggest that "most theories of SRL assume that students can proactively select, structure, and even create advantageous learning environments" (p. 5).

However, findings from this study suggest that an emphasis should be placed on the differences between and within learning environments – such as those found in landscape architecture studios – and how these differences work to influence a student's SRL.

Landscape architecture students self-regulate their learning on studio projects through a process of engaging in design, then using SRL to address issues that arise during design, then generating more design issues that require additional SRL, and so on. This process is both reiterative and reciprocal. This study supports Zimmerman's (2001) claim that self-regulation involves a self-oriented feedback loop during learning (Carver & Scheier, 1981; Zimmerman, 1989, 2000). This "feedback loop" refers to a cyclical process in which students monitor the effectiveness of their learning methods or strategies and respond to this feedback in a variety of ways. While study findings and researchers who study design studios, like Donald Schon, suggest that a similar feedback loop occurs in landscape architecture studios, the findings from this study further suggest that in addition to monitoring their learning methods, students also monitor their design methods since design, learning, and SRL appear to have a strong reciprocal relationship.

A reciprocal relationship in this context means that design involves SRL behaviors. People who engage in SRL not only learn about design, but also learn about more about self-regulative behaviors. A deeper awareness and practice of SRL will improve one's ability to engage design on a deeper level. Thus, the relationship between design learning and SRL is mutual, ongoing, and critical for optimizing learning in studios.

Landscape architecture students emphasize different issues in each year of the program. The issues that students emphasize are a reflection of their understanding of how to design and what it means to learn in a studio. Since students in each year have different understandings of what designing entails, they use and engage in SRL differently. Most research in SRL focuses on how SRL occurs and what factors influence it. Thus, longitudinal studies focusing on how SRL is developed over time are rare. One reason for this may be the time and resources required to investigate this aspect of SRL. However, according to Zimmerman (2001), many SRL studies suggest that students must be aware of the potential usefulness of self-regulation processes in order to enhance their academic achievement. Since awareness is something that is developed by exposure over time, landscape architecture students should be expected to enhance their achievement as they progress through the

program. This assumes, however, that students are exposed to potentially useful SRL activities and strategies related to the process of designing.

A landscape architecture student's capability for engaging in SRL is limited by his or her awareness and understanding of how to design, how to learn in a studio, and how to use effective SRL activities and behaviors. These findings relate to the constructivist principle underlying much of SRL that says learning begins by building upon a learner's prior knowledge. Schunk (1996) says, "students cannot regulate their actions if they are not aware of what they are doing" (p. 342). Study findings support constructivism's basic assertion and Schunk's claim. However, it is important to point out that the "doing" Schunk refers to includes tasks and activities related to the process of design. Therefore, it is more accurate to say that students cannot regulate their actions if they are not aware of what they are doing on the design project. As pointed out earlier, awareness can vary based upon exposure and year in the program. Thus, not all landscape architecture students can be expected to regulate their actions in the same ways or to the same degree.

Design educator Marvin Malecha (1985) says that "a sense of self confidence and disciplined thought is required to seek out the particular issues of a design program… equally important are methods which instruct the student in time management and self-analysis" (pp. 19-20). Malecha's view is similar to the common belief within SRL that says student efforts to self-regulate their learning often require additional preparation time, vigilance, and effort (Zimmerman 2001). While these views are not inaccurate, it is important to note that findings from this study suggest that there is a more complex relationship between design and SRL than just engaging in behaviors such as discipline, effort, time management, and vigilance.

Most notably, students must have some awareness of the need to engage in these behaviors, an understanding of when and how to use these behaviors relative to the design project, and the willingness to do so. Without meeting these conditions, engaging in extra effort or vigilance may amount to wasted time and resources, ultimately lowering the student's self-efficacy (Barone, Maddux, and Snyder 1997). The complex part of the relationship is that in order to meet those conditions, the student must use extra effort, discipline, and other such behaviors. Thus, in studios, students must risk diminishing their self-efficacy in order to build the self-efficacy needed to learn more about how to design.

Study findings support the complex relationship between learning how to design, engaging in SRL behaviors, and the key role that factors such as self-efficacy play in this relationship. Moreover, study findings begin to explain why one student engages in SRL while another does not. For example, findings show that SRL activity and behavior is initiated in response to issues and needs that arise while working on the design project, only those students who recognize the needs associated with designing and learning in studio will feel the greater need to engage in self-regulation. In turn, SRL helps students identify project-related needs and issues that they should address through design, thus leading to greater engagement with the design project. Research in SRL supports these findings. According to Zimmerman (2001), SRL involves more than detailed knowledge of a skill; it involves the self-awareness, self-motivation, and behavioral skill to implement that knowledge appropriately.

One important issue to mention here is that research done by people like Resnick and Glaser (1976) provide striking examples of students failing to solve problems for which they posses the necessary solution procedures. In other words, sometimes a landscape architecture student knows how to design but just fails to do so. The common rationale for this behavior is a lack of self-efficacy that comes from a perceived inability to use their knowledge to solve the problem. Along with this is a fear that the solution will be wrong and they may look incompetent. The result is that the student does not solve the problem even though they know how. The issue that this raises in terms of this study is that it is possible that some underperforming students and those engaging in ineffective SRL behaviors did so, not out of a lack of knowledge, but for other reasons. What this means is that once a student attains a basic level of knowledge relative to design and SRL, it is important to ensure that the individual feels capable of his or her ability to use that knowledge as a basis for completing the design project.

Study findings indicate that high achievement in a landscape architecture studio is a result of advanced knowledge that comes from the freedom to pursue additional issues and learning beyond the basic requirements of the project. The freedom comes when a student attains the knowledge and expertise to shift cognitive resources away from learning how to design and gaining an awareness of effective SRL activities and redirects them towards risk-taking, personal interests, and learning new information. As mentioned earlier, this assumes

that the student has the self-efficacy to use his or her knowledge and applies the effort to seek additional learning.

Many SRL studies address the issues associated with this study's finding related to achievement. According Zimmerman (2001), SRL studies attempt to explain and describe how a particular learner will learn and achieve despite apparent limitations in mental ability, socio-environmental background, or in quality of schooling. For example, Zimmerman and Martinez-Pons (1986) found that a significant factor in achievement was that higher achievers relied more heavily on social sources of assistance in learning.

This study tends to support findings like those of Zimmerman and Martinez-Pons, and others, which recognize the efficacy of one or another factor in terms of achievement. However, findings form this study do suggest that the factor (i.e., social assistance) is less important than how it is used in relationship to solving the design problem. In other words, most students in this study used social assistance for one reason or another, however, it influences their achievement not because of use, but how they engaged in social assistance. When it was deliberate, goal-based, and used consistently it seemed most effective.

The next section will discuss the implications of these findings in terms of various aspects of landscape architecture education.

STUDY IMPLICATIONS

The study findings have both theoretical and practical implications. For example, by contributing new knowledge to the existing body of knowledge in landscape architecture education, the study provides educators with a new theoretical perspective for thinking about their teaching and learning practices. In doing so, studio professors will hopefully find an everyday use for the study's findings and intervention guidelines as well as discovering new applications of their own. This section discusses the implications of the research findings for studio professors, landscape architecture students, program administrators, the profession of landscape architecture, other design fields, and SRL.

Studio Professors

1. *Learn about Learning.* Professors should take the time to learn more about how their students learn from an educational and cognitive standpoint. This includes becoming more familiar with concepts such as self-regulated learning, social cognitive theory, information processing, and other theories that have implications in their studios. Study findings indicate that learning design is not a straightforward process. The level of each student's understanding of design varies widely even within the same studio. Thus, by learning more about how landscape architecture students learn within the studio setting, professors can inform their teaching and enrich the studio learning environment.

2. *Diagnose Student Understanding.* Professors should diagnose their students' level of understanding of design and conceptions of what learning means in a studio. Study findings suggest that students develop their understanding at different times and in different ways. Thus, professors should diagnose these differences at the outset of the studio each semester. By diagnosing their students' understanding and ability to design, professors can anticipate possible problems and rectify confusion and misconceptions before advanced issues are presented. Some ways to diagnose students include short projects, concept mapping, and discussion.

3. *Monitor Student Engagement.* Study findings indicate a connection between a student's understanding of design and the SRL activities that they engage in as a result. Therefore, professors should monitor their student's behavior and activities, not necessarily in terms of design as such, but how the student's activities reflect an understanding of the process of designing. In addition, professors should monitor their students to ensure that students use effective SRL behaviors and activities relative to their understanding of design. If a professor detects that one or more students are not engaging the project or in SRL activity, then they should attempt another diagnosis of the student to see what the problem might be. If students seem to know how to design but are choosing not to engage, then self-efficacy or environmental factors such as the professor him or herself could be the problem. Most importantly, the professor should gradually transfer the responsibility for monitoring to the students themselves.

4. *Facilitate Engagement.* Study findings indicate that certain activities are more effective and associated with higher achievement than other activities are. Professors should facilitate

student engagement in activities that support effective design. This should be done carefully so that choice and ownership for learning are not undermined, thereby reducing the key role of SRL within the SLR/design relationship. The most effective way to facilitate engagement is to have students set their own goals that are specific but flexible, learning-oriented, reflect the nature of design, and contain a plan for completion. The professor can then check to see if the student's goals fit within the broader objectives of the design project and course description.

5. ***Encourage Ownership.*** Study findings indicate that when students take ownership for their work, they tend to become more engaged with their projects. Thus, studio professors should encourage ownership and the role that it plays in the SRL. Ownership and choice in learning engender motivation and initiate many self-regulative behaviors. When ownership is reduced, the student is no longer working for him or herself and thus needs additional external guidance and direction. One way to ensure ownership is to have students challenge themselves with special issues on the project. However, students should address issues beyond their capability and understanding.

6. ***Self-Efficacy.*** Studio professors should provide critiques and feedback that positively affect a student's self-efficacy. Unreasonably harsh critiques, especially public ones, can undermine a student's belief in their own capability to perform certain design-related tasks and behaviors. Study findings show that a student's self-efficacy can diminish his or her performance even when he or she knows how to design. In other words, a competent student can have his or her self-efficacy damaged to such a degree that it has a counterproductive effect, resulting in less engagement on future projects even though the student is aware and understands how to design. On the other hand, self-efficacy is improved when students make steady progress and develop their knowledge and skills through a series of attaining smaller, intermediate goals.

Landscape Architecture Students

1. ***Become Familiar with SRL.*** Study findings indicate that students who have a greater awareness of appropriate SRL strategies and behaviors are more capable of using them while designing. Thus, students should familiarize themselves with SRL activities and behaviors that support the process of design and learning in a studio. This means students should examine general SRL strategies and assess their value within the context of their projects and the studio. By becoming familiar with SRL activities and strategies, students build a catalogue of different ways that they can support their own learning.

2. ***Develop Competency Slowly.*** Study findings suggest that students who master the basic competencies associated with designing before moving on to advanced topics are better prepared for higher achievement. Thus, students should avoid attempting to learn additional topics and addressing additional issues related to the studio project until they have a basic understanding and are competent in designing. The professor may best make this decision because he or she is likely to be more objective in determining a student's competency. However, since design involves thinking and since thinking is not always discernable, professors and students should have frequent discussions about a student's competency and understanding. Discussions such as these might not necessarily even involve topics directly related to landscape architecture such as storm water management and parking standards but instead discussions might focus on general skills like representation and knowledge of process.

Program Administration and Curriculum

1. ***Learn about Learning.*** Administrators should understand more about learning from an educational standpoint and not just in terms of landscape architecture or design so that they can use this as a basis for reflecting upon the quality of their programs. For example, knowing that the SRL and design learning relationship is ongoing and process-oriented, it seems reasonable that program administrators would organize their studio sequence to respond to this basic progression rather than organizing the studios topically or by subject. When administrators lead their faculty in terms of understanding of how students learn, then administrators are in a stronger position to facilitate learning-oriented curriculum

discussions. An additional benefit is that learning more about how student learn can also help administrators review their faculty's efficacy and make suggestions for improvement.

2. ***Curriculum Structure.*** Study findings suggest that learning landscape architectural design is a process. This suggests that curriculum should be structured to support the process-oriented nature of learning how to design. Study findings also show that issues and topics are learned as a result of engaging in the process of learning how to design. Thus, the process of designing provides the structure for addressing issues and topics rather then issues and topics providing a structure for learning the design process. Therefore, administrators should avoid focusing on topics or making their studio sequence reflective of a topic-orientation, particularly if it comes at the expense of learning the process of how to design.

Architecture

1. Study findings suggest that many of the issues associated with design and SRL are not necessarily applicable to landscape architecture alone. Many issues and even the process of learning how to design are very similar in architecture. Thus, since architecture and landscape architecture share many of the same roots in terms of the studio and design project, it seems reasonable to suggest that students and faculty in architecture and other fields that use studios and design projects can benefit from learning more about the relationship between SRL and design. In addition, each discipline should attempt to modify SRL to fit within its own set of issues. Overall, the findings and implications presented in this study should have similar applications in architecture and other related fields.

Self-regulated Learning

1. Study findings suggest that SRL and design have a reciprocal relationship whereby one can either improve or diminish the other depending on a student's level of knowledge and awareness. Previous studies have rarely explored this type of relationship between SRL and a particular subject. Moreover, since SRL researchers have never studied landscape architectural design, the nature of this relationship becomes even more intriguing. Findings related to how SRL differs in landscape architecture studios should present new challenges for SRL researchers to consider and explore.

GUIDELINES FOR DEVELOPING INTERVENTION STRATEGIES

While this study did not test the validity of any particular intervention strategy, findings suggest that since the problem of poor student performance and engagement arises primarily out of a lack of knowledge relative to design and effective SRL, the most important intervention strategy is ensuring that students learn the basics of design before moving on to more advanced issues. Studio professors are encouraged to use creatively the study findings as a basis for developing their own intervention strategies to enhance their students' SRL. However, five guidelines designed to assist professors in developing their own intervention strategies are listed below.

1. ***Project Diagnosis and Goals Setting.*** Upon assigning a new project, have the student conduct a thorough analysis of the project in order to identify its requirements, opportunities, and barriers. Ask the student to use their analysis as a basis for generating learning-oriented goals. Ensure that the student writes down his or her goals for the project and that the goals are well articulated and aimed at improving the student's competencies. Encourage the student to achieve all of their goals for the project.

2. ***Plan, Record, and Share.*** At the beginning of the project, have the student develop a plan for achieving their goals and executing the project. The plan should help the student manage the project while addressing time and resources. Ask the student to write their plan down and update it regularly. Encourage the student to share his or her plan with other students in order to learn different ways to execute a project.

3. ***Interaction and Modeling.*** During the project, have the student interact with other students in the studio with more skills and knowledge. Ask the student to use his or her goals as a basis for interaction and soliciting feedback. Encourage the student to write down or graphically represent what they discuss.

4. ***Goal-Based Concept Development.*** During the project, have the student generate an ample, if not excessive, amount of notes and drawing to express his or her project ideas and solutions. Ask the student to judge each note and drawing in terms of his or her goals. Encourage the student to use these drawings as a basis for discussions with other students and as a means for providing goal-based feedback.

5. ***Review and Remediate.*** At the end of the project, have the student review his or her goals and goal plan. Ask the student to identify those strategies and behaviors that worked and those that did not work. Encourage the student to continue using those strategies that worked and to set goals for the next project that will improve their deficiencies.

STUDY LIMITATIONS

Many different decisions have factored into the planning of this study. These decisions have influenced the study by, among other things, defining its scope, facilitating data collection, and contextualizing the data analysis. However, these decisions have also had a limiting effect on the study's findings and their generalization. Two of the most significant limitations are listed below.

1. ***Limited number of study participants.*** Since this study was a first of its kind in landscape architecture, it was prudent to narrow the scope of the study to include a small group of students from one program in order to avoid spending excessive time and valuable human resources. By limiting the number of students interviewed to twenty-one, a balance was achieved in terms of the amount of data collected compared to the amount of data that the researcher could reasonably analyze. Furthermore, opportunities for going more in-depth with each interview and probing students for additional information were increased by interviewing a smaller number of students. Even though 21 students is a sufficient sample size for studies of this nature, the number of participants still limited the study by reducing the diversity of data collected and making it more difficult to generalize the study's findings. The findings would have increased validity and reliability if additional students from other programs had been interviewed.

2. ***Program Philosophy.*** It is possible that the differences inherent in any landscape architecture program will lead students to employ different SRL strategies and behaviors. By not interviewing students from other programs, any SRL strategies and behaviors that are unique to students at those programs remain undiscovered. Future studies should attempt to interview students from multiple programs in order to increase study reliability and validity while enhancing opportunities for discovering new information about how students' self-regulate their learning.

SUGGESTIONS FOR FUTURE STUDIES

This study investigates the role of student self-regulated learning (SRL) in the landscape architecture studio. The primary goal of the study is to provide studio professors with information that helps them understand the reciprocal relationship between SRL, landscape architectural design, and the studio environment, so that they can use this knowledge as a basis for enhancing their students' learning and achievement. This section offers several suggestions for future studies related to this dissertation.

1. The guidelines for developing intervention strategies presented earlier in this chapter should assist professor in designing their own techniques and methods for enhancing their students learning thorough a better understanding of SRL. The techniques and methods that professors design should be shared and tested in future studies so that a catalogue of effective intervention strategies can be developed.
2. Landscape architecture, architecture, interior design, and other design disciplines all use studios and projects as a primary basis for teaching and learning. However, this study has only focused on landscape architecture students because of the researcher's familiarity and access to this group. However, one might suspect that the study's findings should apply to other studio settings where PBL is used and students execute design projects. In order to support this claim, studies of students in other design disciplines should be conducted.

3. Since this study is a first of its kind in landscape architecture education, it was important that it be broadly focused in terms of how SRL influences learning and achievement. As such, the study did not focus on a single aspect or variable associated with SRL. Future studies should take one or more of those components presented in this study and examine them more explicitly. For example, a study that focuses on how social interaction between the studio professor and learner influences SRL would be useful.

CONCLUSION

The profession of landscape architecture is expected to grow in the coming years as people become more concerned about our environment. This means that landscape architecture programs around the country should begin preparing for increasing numbers of students and additional demands on their limited resources. One way that landscape architecture programs can become better equipped at dealing with larger numbers of students, while at the same time ensuring that their students learn the necessary knowledge, skills, and behaviors to become competent professionals is by encouraging self-regulated learning. Therefore, this study's primary goal is to provide studio professors with information that helps them understand the reciprocal relationship between SRL, landscape architectural design, and the studio environment, so that they can use this knowledge as a basis for enhancing their students' learning and achievement.

Findings from this study show that landscape architecture students engage in SRL behaviors in response to issues related to the process of designing or related to the studio environment. Through a reiterative and reciprocal process, students address issues that arise during studio projects based on several factors including the student's understanding of how to design; pressure from external, non-studio factors; and an awareness of possible self-regulated activities and behaviors. High achievement in a landscape architecture studio is a result of advanced knowledge that comes from the freedom to pursue additional issues and learning beyond the basic requirements of the project. The freedom comes when a student attains the knowledge and expertise to shift cognitive resources away from learning how to design and gaining an awareness of effective SRL activities and redirects them towards risk-taking, personal interests, and learning new information.

The benefit of this study for studio professors is that by expanding their understanding of the relationship between SRL and the design project, they increase the likelihood for improving their pedagogic approach (i.e., PBL in studios) and enhancing opportunities for facilitating student learning and achievement. The study contributes new knowledge to the body of landscape architecture education by way of the study's findings and the suggested guidelines for intervention. Landscape architecture programs and studio professors should consider learning more about self-regulated learning in order to understand its potential for improving their students' learning and achievement.

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