Regulating Student Achievement and Learning in Design Studios:
The Goal Regulation Model

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ABSTRACT

Existing models of learning in design studios fail to explain learning or predict achievement in ways that effectively guide pedagogic decision-making. This paper discusses an alternative model of learning in design studios known as the *Goal Regulation Model (GRM)*. The GRM supports the commonly held belief that students learn by doing; however, it extends this idea by integrating it with two educational theories, social learning theory and self-regulated learning, in order to provide a stronger theoretical basis for decision-making. The GRM was derived by combining these two theories, interviewing a range of students, and applying the results in design studio settings. The underlying belief of the GRM is that goals drive a student's learning while self-regulation directs it. The GRM supports this belief and explains its reciprocal effects on teaching and learning. This paper: 1) summarizes the GRM's theoretical framework, 2) describes the GRM's interdependent phases and processes, and 3) presents several guidelines for improving student learning and achievement.

1. INTRODUCTION

Educators will often adopt and utilize a particular teaching approach without necessarily considering the theory that underlies their actions. In landscape architecture education, specifically studios, teachers typically theorize that students learn to design through the process of doing consecutive, increasingly complex projects. In this commonly held view, learning occurs as students gain experience (i.e. knowledge) through the practice of doing (e.g. making mistakes, achieving success, etc.). While theorizing learning as a process of doing is broadly accurate, it does not provide a strong enough basis for guiding the daily actions of studio teachers nor does it adequately explain the fundamental interaction between motivation and achievement. Without a strong theoretical foundation underpinning studio teaching, it is difficult for teachers to justify their practices, measure learning outcomes, and evaluate teaching effectiveness.

This paper offers a new framework for thinking about learning in design studios known as the *Goal Regulation Model (GRM)*. The GRM fits within the notion that students learn by doing; however, it also extends this commonly held belief to include a stronger theoretical foundation for pedagogic decision making and establishes a model for predicting learning outcomes. Two educational theories, social learning theory and self-regulated learning (SRL) provide a basis for the GRM. By combining these two theories, interviewing a range of students, and applying the results to studio settings, a new view into the processes associated with studio teaching and learning emerges.

2. LITERATURE REVIEW

The following sections discuss literature associated with social cognitive learning theory, self-regulated learning and goals in order to develop a theoretical framework for investigating the relationships between student goal use, learning, and achievement. In addition, the literature serves as a foundation for constructing the GRM.

2.1 Social Cognitive Learning Theory

Social cognitive learning theory emphasizes the belief that most learning occurs socially by observing other people. Through social learning, people acquire knowledge, rules, skills, strategies, beliefs, and attitudes (Schunk 2001). Three assumptions of social cognitive learning theory that are relevant to this study include: 1) self-efficacy, 2) learning and performance orientations, and 3) sub-processes including a) self-observation, b) self-judgment, & c) self-reaction (Figure 1).

Theoretical Assumptions of Social Learning Theory	**Descriptions**
Self-Efficacy	Self-efficacy refers to the judgments of one's own ability to perform specific behaviors and attain desired levels of performance (i.e. goals). Self-efficacy is an underlying belief that strongly influences a student's choices and behaviors. It is modified by many factors, such as previous successes and failures at attaining goals (Bandura 1977).
Learning & Performance Orientations	A performance orientation focuses on grades, rewards, and approval while a learning orientation stresses mental challenge, thought development, and metacognition. These two orientations determine the types of goals students will set for themselves with each orientation exerting different effects on a student's self-regulatory activities (Schunk 1996).
Three Sub-Processes: • Self-Observation • Self-Judgment • Self-Reaction	These three sub-processes of social learning begin with a student observing himself or herself in light of goals. Then, the student will judge their own progress, again with respect to their goals and based upon their self-observations. Next, a student will react according to the judgments that they make about what caused, or failed to cause, their progress towards goals (Schunk 1996).

Fig. 1: This chart briefly describes three different features of social learning theory applicable to student goal use and self-regulation.

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).

2.2 Self-Regulated Learning

For over 20 years, researchers have studied student ability, motivation, and quality of instruction in an effort to better explain student learning and achievement. During this time, numerous empirical studies focusing on the role of students' personal attributes and the psychological processes underlying their academic learning and performance have increasingly emerged (Schunk and Zimmerman 1994). These studies have led to a growing interest in the concept of self-regulated learning (SRL) as an important variable that interacts with achievement (Zimmerman, 1989). Barry J. Zimmerman (2000), a leading SRL authority, defines the construct of SRL as the self-generated thoughts, feelings, and behaviors oriented toward attaining goals. While conceptualizations of SRL vary, most researchers agree that SRL involves learners: a)

having a purpose or goal, b) employing goal-directed actions, c) monitoring their own behaviors, and d) adjusting their learning to ensure success (Schunk 1996).

A critical aspect of SRL is that learners have some choice in the learning situation since SRL varies from high to low depending on the amount of choice learners have and what they choose to do (Schunk 1996). The greater the degree of choice a learner has, the stronger the effects of SRL on learning and achievement. Researchers have been exploring SRL's pedagogic implications through both experiments (Schunk and Zimmerman 1994) and intervention studies (Schunk and Zimmerman 1998) and report compelling results in improving students academic functioning. The last two decades of research has clearly established the validity of SRL as a predictor of students' motivation, achievement, and learning (Zimmerman 2000). Since SRL is especially influential where students have a high degree of choice in their learning outcomes, as they do in design studios, and since a growing body of literature supports the notion that optimal academic achievement is strongly tied to the degree of SRL the learner is capable of exercising (Zimmerman and Martinez-Pons 1986, Zimmerman 1990) it seems reasonable for design educators to consider exploring SRL for its capability of explaining differences in students' learning and achievement in design studios.

2.3 Goals

Success at mastering cognitively complex tasks, like a design project, requires remaining focused and efficient in the face of obstacles and changing circumstances (Barone, Maddux, and Snyder 1997). It is on complex tasks that self-regulatory skills are most important in ensuring success. Goals are the foundation of self-regulation in that we attempt to regulate our actions, thoughts, and behaviors to achieve some desired outcome. Goals provide the standards or reference criteria against which progress is monitored and abilities are judged (Barone, Maddux, and Snyder 1997). When a student's goals are specific but too easy, or when their goals are too vague (e.g. "Just do your best") students fail to perform at their finest (Locke and Latham 1990). Learners that set general goals, distant goals, absolute (unchanging) goals, or nonhierarchical goals will typically become less motivated and successful (Barone, Maddux, and Snyder 1997). These particular properties of goals detract from efforts to self-regulate because: "a) learners who lack specific goals are often unsure about what to do next, b) learners who set distant goals must wait long periods for corrective feedback, c) learners who set absolute goals are often discouraged about their seemingly slow progress, and d) learners who fail to discriminate strategy processes from performance outcomes hierarchically seldom develop high quality technique" (Zimmerman & Schunk, 2001 pg. 295). Regardless of their specificity, difficulty, and proximity, goals will not influence motivation and behavior unless the learner receives feedback concerning how well they're progressing toward their goals (Locke and Latham 1990). 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).

3. THE GOAL REGULATION MODEL

The GRM is an analytic framework, developed by the author, to help in understanding student learning and achievement in landscape architecture design studios. Since the GRM attempts to show process and predict how learning occurs, it acts as a working model. It is referred to as a *working* model because it's testing and application is ongoing. Essentially, the GRM creates a frame that informs and guides teaching practices while explaining the reciprocal effects of teaching on student learning and achievement.

The GRM shows how a student, through a series of interdependent and reoccurring processes, executes a studio project (Figure 2). Three phases including: 1) planning, 2) performance, and 3) reflection, organize the processes sequentially. At the beginning and throughout each project, a student engages in processes depicted in the model. Figures 3, 4, and 5 below, explain each of the phases and their components in detail. The GRM, like other models of self-regulated learning,

predicts a direct correlation between a student's degree of self-regulating behavior while engaging in the processes, and the extents of that student's learning and achievement. In other words, as a student's self-regulating behavior increases in frequency, sophistication, and self-efficacy by becoming a proactive, goal-oriented learner so does their achievement and learning.

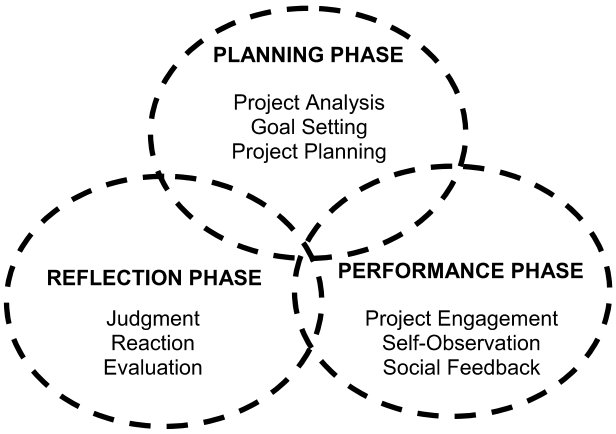

Fig. 2 Shown are the three interdependent phases (Planning, Performance, Reflection) of the GRM, including the major sub-processes associated with each phase.

PLANNING PHASE		
SUB-PROCESSES	COMPONENTS	DESCRIPTIONS
Project Analysis	Project Diagnosis	Student examines the project for requirements, freedoms, opportunities, barriers, and other such information to use in helping set, organize and plan future goals.
	Initial Motivation	Student's level of motivation during the planning phase / beginning of the project. This corresponds to the thoroughness of the project diagnosis, intrinsic interest of the project, perceived relevance, and student self-efficacy.
Goal Setting	Goal Origination	The student's utilization of self-set or teacher-set goals will influence behavior and outcomes. Student-set goals tend to increase motivation and project engagement.
	Goal Motivation	The student's satisfaction and rationale for choosing one goal over another will influence behavior and outcomes.
	Goal Orientation	The student's tendency toward setting predominately cognitive/learning type goals compared to performance/show-off type goals will influence behavior and outcomes. Learning goals tend to lead to lasting improvements in achievement.
Project Planning	Goal Completion	The student's degree of articulation in measuring when and how a goal will be attained will influence behavior and outcomes. The clearer the plan the better.
	Strategic Planning	Student's overall plan for project completion, including time, resources, direction, etc. integrated with and driven by goals.

Fig. 3 Chart showing the Planning Phase and descriptions of the Phase sub-processes.

PERFORMANCE PHASE		
SUB-PROCESSES	COMPONENTS	DESCRIPTIONS
Project Engagement	Self-Efficacy	A student's situation-specific beliefs about their capability to execute successful behaviors. Self-efficacy influences a student's choice of activities and effort, profoundly influencing learning and achievement.
	Design Process	Student's choice of studio-related and project-related behaviors such

	Behaviors	as site analysis, sketching, etc. Efforts should be tied to goals and strategic plans.
Self-Observation	Monitoring	Student's observations of themselves compared to standards (goals) derived from the profession, peers, and other sources. Self-monitoring involves several techniques and influences decision-making. It should be regular and recorded.
	Metacognition	Student's thinking about their own thinking and how this influences decision-making. Helps students evaluate results of monitoring and subsequent reactions.
Social Feedback	Modeling	Learning from other people, or modeling, helps students establish standards, learn skills, and attain knowledge. Encourage modeling of successful behaviors.
	Feedback	The feedback students get from their peers and professors reinforces a student's adoption of certain behaviors that influence learning and/or performance. Timely feedback related to goals is most effective.

Fig. 4 Chart showing the Performance Phase and descriptions of the Phase sub-processes.

REFLECTION PHASE		
SUB-PROCESSES	COMPONENTS	DESCRIPTIONS
Judgment	Self-Judgment	Self- judgment refers to comparing present performance with one's goal and making a judgment as to one's progress. Self-judgments, especially favorable ones, cause reactions that help sustain motivation on future performances.
	Progress Outcomes	The assessment of progress as it relates to goal attainment. The outcomes lead to a student's behavioral reaction.
Reaction	Self-Reaction	Self-reactions to goal progress motivate self-regulated learning. If a student believes they are accomplishing goals and progressing, their positive reaction boosts self-efficacy and increases motivation.
	Sentencing	Consequences and rewards established by students and based on progress outcomes. Includes consequences like staying up late, rewards like taking a day off, or the establishment of sub-goals.
Evaluation	Self-Evaluation	The value a student attributes to their progress towards goals. Students tend to have higher achievement when evaluations suggest that efforts were worthwhile.
	Constructive Preparations	Student develops new knowledge constructions and experiences a change in their self-efficacy that translates into a student's motives and goal orientations for the next project.

Fig. 5 Chart showing the Reflection Phase and descriptions of the Phase sub-processes.

4. GUIDELINES FOR IMPROVING STUDENT LEARNING AND ACHIEVEMENT

The following guidelines are based upon preliminary findings from an ongoing study of the GRM. The guidelines focus on goal use since goals are the primary factor influencing student self-regulation. In addition, goals are the driving force carrying students through the design project as explained in the GRM. Therefore, implementing these suggestions should lead to higher student learning and achievement results.

1. Promote goal setting and strategic planning, then, use these goals and plans as a point of departure for discussion and feedback.
2. Ensure that each student sets a range of goals including those that are specific, hierarchical, reasonably difficult, flexible, and learning-oriented.
3. Encourage students to write their goals down so that they can reference and monitor them later during the project.
4. Suggest that each student post their goals for other students to see in order to enhance opportunities for social modeling and to advance accountability.
5. Support group discussions and feedback that focus on goals by utilizing the social setting of studios to help students evaluate each other's progress.
6. Establish lists of goals related to completing the project (i.e. project performance) and lists related to developing conceptual knowledge (i.e. skills and knowledge not

necessarily demonstrated in the project drawings). Use the lists as an organizer for teaching and learning and as a reference point for assessing learning outcomes.

7. Find ways to give students ownership of projects and the goals associated with them in order to elevate motivation by increasing goal relevance and intrinsic interest.

5. CONCLUSIONS

Currently, the GRM provides a framework situated within current research in educational psychology that helps design faculty to reflect upon and consider revisions to their current teaching beliefs and practices. This alone is a significant development in the effort to redesign studios to facilitate maximized student learning and achievement. In the future, the GRM will need more examination and study in studio settings in order to determine its validity and ability to predict student achievement and learning. Design instructors interested in enriching their students' academic accomplishments are encouraged to find ways of applying the GRM in their studios and report their findings back to the author.

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