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The Studio Experience at the University of Georgia:

An Example of Constructionist Learning for Adults

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Abstract

The studio curriculum in the Instructional Technology program at the University of Georgia (IT@UGA) represents a deliberate application of contemporary theory of how adults learn complex information in ill-structured domains. The IT@UGA Studio curriculum, part of a graduate program leading to a Master's degree, has been implemented since 1998 to prepare professionals to design, develop, evaluate, and manage educational multimedia. Theoretical considerations played a major role in shaping the design of the Studio curriculum. Prominent among these were constructionism, situated cognition/situated learning, and self-directed learning. Important related theoretical constructs included scaffolding and flow theory. This paper describes the Studio learning environment, presents these theoretical concepts, and discusses the application of theory to practice in the training of adults in instructional design and development (IDD).

In graduate programs at universities around the United States, the one-course/one-instructor model has long been the standard. This model has many strengths, but it also places limitations on the authenticity of instruction for the professional contexts of many disciplines for which students are preparing. Students can be poorly prepared to participate in ill-structured consultant-client relationships or communities of practice found in many professional contexts when an instructor excessively structures their graduate education in a top-down fashion. The purpose of this article is to discuss a unique form of graduate education in instructional technology at the University of Georgia (IT@UGA), called simply the Studio, where students are enrolled in multiple courses involving several faculty and all collaborate over an extended period of time (three 16-week semesters). The studio curriculum comprises a very different course organization and structure with roles for students and faculty quite dissimilar to that found in the one-course/one-instructor model. One can liken the studio curriculum to a new way of "governing" in graduate education. Similar to the Constitution of the United States the Studio model denotes new rules and relationships of power, authority, and responsibility that are intended to be fair and equitable. Also similar to the U.S. Constitution and to constitutions of other nations, the studio is an imperfect embodiment of underlying ideals. For the Studio, these underlying ideals include the epistemological beliefs and principles of constructivism. A decade's worth of experience with the studio curriculum suggests to us that it is an effective and appropriate approach and one that is superior to the alternative — a curriculum in which virtually all of the decisions about what to learn and how are made by an instructor. The studio curriculum is consistent with Dewey's educational philosophy as set forth in *Democracy and Education*: "A society which is mobile, which is full of channels for the distribution of a change

occurring anywhere, must see to it that its members are educated to personal initiative and adaptability" (Dewey, 1916, p. 84). This "personal initiative and adaptability" is, in a real sense, what the Studio experience is all about.

The purposes of this paper are to describe the theoretical and philosophical principles upon which the Studio curriculum is based and to explain, briefly, how the Studio curriculum works. We also provide a critique of the studio's ten-year implementation based on a review of student evaluations, student surveys, and student comments collected en route, in combination with instructor reflections.

An Overview of the IT@UGA Studio Curriculum

The structure of the Studio curriculum is summarized and illustrated in Figure 1 and Table 1. Figure 1 illustrates the sequence of the studio courses in the context of other important required courses that are part of the overall graduate curriculum leading to a Masters degree. Table 1 summarizes the requirements for each of the studio courses along with some of the other important expectations, such as peer mentoring. For a complete description of the curriculum, refer to the Studio Handbook (Rieber, Orey, & King, 2008), revised and published each semester on the IT@UGA Studio Web site.[1] The studio curriculum comprises a total of 12 credits within a standard 36-credit hour master's curriculum. Each studio course carries four graduate credits, including 1 credit for lab work. The remaining courses in the master's curriculum are three credits each. Other required courses are typical to a master's curriculum in instructional technology and include courses such as instructional design, learning theory, project management, and educational research methods. These other required courses are taught using the one-course/one-instructor model. Electives, comprising nine graduate credits, are typically

[1] http://it.coe.uga.edu/studio

taken in topics such as advanced instructional design, video production, and adult learning theory. Interestingly, Table 1 provides the relative contribution of each course requirement to the final grade of Studio participants. Anyone familiar with constructivist perspectives on education knows of the tension or even contradiction between this philosophy and any judgment of a learner's performance. This issue will be addressed throughout this paper, but it is worth noting here that this is an example of the compromises that must be made between trying to work within a constructivist learning environment and a formal educational system, such as a university.

The originators of the studio curriculum — Lloyd Rieber, Michael Orey, and James King — envisioned the learning of educational multimedia design to that of an art or architectural studio (Tripp, 1994) in which a group of people learn skills and develop expertise while working on authentic projects in a public space comprised of tools and work areas.

Figure 1. Sequence and General Philosophy of the IT@UGA Studio curriculum

(Notes: The studio courses are circled; EDIT 6190 may be repeated and can fulfill the "advanced development" requirement of the Masters curriculum.)

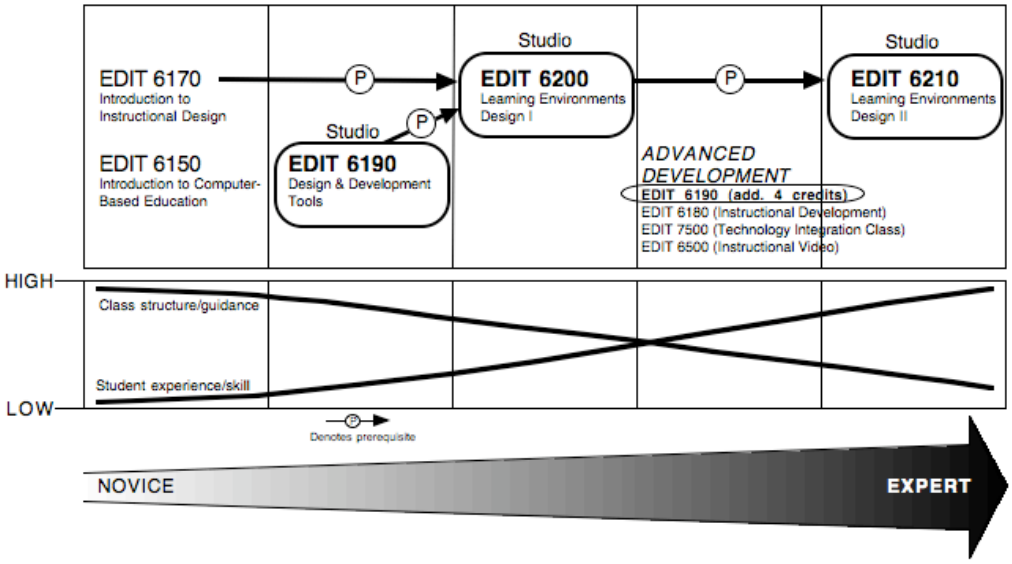

Table 1. Specific Participant Requirements of Each of the Studio Courses with Relative Contribution to Final Grade

	First Course EDIT 6190 Design & Development Tools	Second Course EDIT 6200 Learning Environments Design I	Final Course EDIT 6210 Learning Environments Design II
Participation *Attend all mandatory meetings and activities; Follow all course procedures*	15%	15%	15%
Community Service *Provide at least 10 hours of service to any non-profit group or agency; the service must relate in some way to instructional technology*	10%	10%	10%
Peer Critiques *Write at least 4 constructive critiques of other peers' design work throughout the term*	10%	10%	10%
Individual Multimedia Project	45% Negotiated with the studio manager for this course; project based on design principles aligned with constructionism, *not* those of instructional design.	40% Scope: One lesson; Project evaluated based on *instructional* design principles consistent with educational multimedia	Mentor students in EDIT 6190 and EDIT 6200
Team Multimedia Project	5% Attend at least two meetings of EDIT 6210 Project Teams and comment on these in your design journal	15% Consultant on one EDIT 6210 Team Project providing at least 20 hours of consultation	40% Scope: One unit; Assume role and responsibilities on one team project in negotiation with other team members and

			studio manager for this course; Typical project roles include Project Manager, Instructional Designer, Graphic Designer, Programmer, Evaluator
Comprehensive Exam	Prepare for comprehensive exam by reading and discussing assigned course readings and other readings of your choice related to all aspects of instructional technology (theory, research, and practice)		Oral exam If performance is not satisfactory, the oral exam is repeated after given feedback; if second oral is not satisfactory, a written paper on assigned literature is required. (Note: No percentage of contribution is provided because this requirement is considered a general requirement of the masters degree.)
Writing Activities	15% Maintain a design journal while completing project; integrate design literature within journal entries	10% Individual project documentation and formative evaluation report	25% Team Project Documentation (examples include needs assessment, performance objectives, treatment rationale and description, formative evaluation report, client sign-off forms)

The studio curriculum comprises a sequence of three courses that we will refer to as the first course, second course, and final course, respectively. While such a structure and progression is common to most universities that have instructional technology programs, what is unique here

is that students and faculty in all three courses meet and work together throughout the semester. A typical studio class begins with all participants meeting in one room to review the evening's activities, discuss a design theme or issue, or to review the progress of the final course's design teams. As students go to various activities and events scheduled for their respective class, many of them organized by the participants themselves, they meet, help, and interact with a variety of their classmates. It is expected that the more experienced and skilled Studio participants will mentor those with less experience and skill. Of course, each participant has unique responsibilities associated with their respective course, but all have opportunities to call on any of the instructors and other participants for help, advice, and critiques as project development proceeds during the semester. This all-in-one structure helps to demonstrate and explain the requirements and dynamics of the more advanced courses for all participants from the very beginning of the studio experience. This structure also helps to legitimize established aspects of the Studio culture, such as the community service requirement (see Table 1), as each new group of students sees these in operation among their more seasoned peers. The culture of the studio is evidenced by the fact that when participants are asked about their graduate load in a semester, they typically respond first by stating they are "in the Studio," and second by listing the particular studio course.

Imposed structure on participants diminishes progressively while they complete the three courses in the studio curriculum. In the first course, the instructor prepares a weekly agenda, readings, discussions, and workshops for the most typical tools chosen by participants. In the second course, the instructor organizes weekly design discussions and organizes a schedule of project design documents and other project deliverables. In the final course, the participants are expected to organize themselves into teams and each team is then responsible to organize their

weekly meetings and semester schedule for developing their team project. In all three courses, even the first course, the second half of the semester is characterized less by any explicit course structure and more by work on the respective studio projects. At the end of the semester, all of the participants show their projects in a public forum called the Showcase at which the public and professional community are invited to attend. Similar to an athlete or musician who willingly spends countless hours practicing basic skills in order to be able to complete in the "big game" or performance (Anderson, Reder, & Simon, 1996), the showcase provides an authentic and motivating context and rationale for devoting the necessary time it actually takes to design and develop a multimedia project.

The goal of the first course is to learn broadly about the nature of design while acquiring proficiency with multimedia tools. Participants can choose any project topic they wish and there is no expectation that the project will be instructional in nature. Indeed, participants are encouraged to choose a topic that they are passionate about and committed to completing, one that will more likely be characterized by a degree of the "flow" experience (Csikszentmihalyi, 1990). Although workshops are provided on key introductory aspects of the prominent multimedia tools, and assistance from instructors and more skilled participants is provided throughout the semester, participants are largely responsible to set and maintain an independent learning plan for learning the tools sufficiently. They keep a design journal in which they reflect on the design of their project in light of the design literature they read during the semester. Readings for the first course have evolved over the years but have always included selections from Terry Winograd's *Bringing Design to Software* (1996). Students finish the course having explored and reflected upon principles of design, having designed a personally relevant project, and having acquired a level of technical proficiency in a range of multimedia tools.

Before proceeding to the second course, students must not only complete the first Studio course but must also complete the program's introductory course in instructional design. The instructional design course is taught separately from the Studio sequence out of pragmatic considerations, chief among which is to allow students to focus exclusively on learning this skill set for a semester without having to keep track of the broader responsibilities associated with being a part of the Studio community (unless they happen to take both instructional design and the first Studio course in the same semester). The separate, one-course/one-instructor instructional design course also allows flexibility in accommodating the instructional styles of various faculty members who may teach the course. Participants are thus expected to begin the second Studio course with a firm understanding of instructional design along with their growing multimedia design and development skills.

The goal of the second course is to design a multimedia lesson for an external client, following a general project framework similar to that provided by Alessi and Trollip (2001), which also normally serves as the required text. In addition, participants perform 20 hours of consultation on one of the final course's team projects by performing well-defined tasks and activities as defined by the final course's team members. Through this consultation, they also learn about the elements and dynamics of a larger team project. A brief orientation to this consulting role is provided by one or more of the Studio instructors. They are counseled to pay close attention to how teams organize themselves in order to use those strategies that work well when they are team members the next semester, as well as to avoid problems encountered by teams.

The goal of the final course is to design, in a team setting, a multimedia unit consisting of approximately 3-5 lessons for an external client. By the time participants reach the final course

they have developed a wide array of skills and experiences from their prior experience in the Studio and from other courses in the master's curriculum (e.g., project management). Participants are also expected to come to the final course knowing more about their own strengths, weaknesses, and ambitions. For example, an important decision for each team is choosing one project manager. Teams also need to identify who will take the lead on the project's design, development, and evaluation. All teams have to work well with the consultants, that is, students enrolled in the second course. The 20 hours of consultation that each second course participant brings must be carefully and strategically managed and used. All students in the final course are expected to provide informal mentorship and leadership to other studio participants, drawing legitimacy from their status as experienced Studio citizens as well as from the work they present as a team. The value of peer mentoring among graduate students is supported in mentoring literature (e.g., Allen, Russell, & McManus, 1999; Grant-Vallone & Ensher, 2000) as well as in the concept of communities of practice (Lave & Wenger, 1991). Discussions of this role are typically held during various meetings with students in the final course. Their team projects are held up as models for all participants, and they are expected to share the progress of their project throughout the semester to the entire studio community.

In keeping with university requirements, each Studio course has its own instructor of record; however, the teaching model in the Studio is essentially that of team teaching. Each instructor of record is the primary facilitator of instruction for the students in his or her course and carries the usual responsibility for assessment and submission of grades. However, a substantial amount of instructional activity is shared among the instructional team and may be delivered in full-group sessions. Often the team includes not only the three primary instructors but also one or two other faculty or graduate assistants who may have occasion to participate in a

co-teaching or support capacity. Typically, the instructors hold a weekly meeting to prepare for that week's class as well as to plan for activities scheduled for later in the term. For example, one major activity that must be planned anew each semester is a series of non-mandatory special interest group or SIG meetings that focus on current topics of interest in instructional multimedia. These informational meetings often feature guest speakers. Recent SIG topics include graphic design, gaming, virtual worlds, and instructional design and development in the workplace.

Assessment in the Studio at all course levels is based primarily on performance rather than knowledge, and is specifically tied to the major project for each course. While instructors are free to adjust their approach to assessment according to preference, each course level presents its list of requirements and deliverables (see Table 1). There are two important instances of assessment in the Studio program that are variations of this theme, however. First, goals for the final project in the first course are articulated by the student, within very broad limits (these goals are in place by about the midpoint of the semester). Consequently, assessment of the project is based not on a rubric created by the instructor but by the degree to which the student has fulfilled his or her own goals. Second, on the other end of the philosophical spectrum, a brief culminating oral exam is embedded in the final course. This 30-minute session, normally conducted by the instructor of the final course and a volunteer doctoral student, focuses on a student's knowledge and understanding of instructional technology literature. Though the exam session is brief, students know that they must be prepared to discuss any of a number of seminal issues of the field in areas such as foundations, instructional design, learning theory, and professional practice. This knowledge-based exam is assessed on a pass/not yet pass basis, and thus it can be repeated if needed.

Dominant Theoretical Constructs Behind the IT@UGA Studio Curriculum

What is the theoretical justification for such a curriculum structure? The design of this structure was explicitly based on fundamental principles of learning and design found in the professional literature. Admittedly, the studio curriculum was initially influenced and based largely on the combined experience of the founding studio instructors when it was first implemented in August, 1998. However, this experience was influenced by the professional literature related to learning and design. Among the most important and influential theoretical constructs found in the literature were those based on constructivist principles, such as constructionism and situated cognition. However, the studio curriculum, much like the instructional technology field, reflects a pragmatic aggregation of theories and philosophical positions.

The following three theoretical perspectives were expressly identified by the founding Studio instructors as being foundational to the curriculum they were attempting to create: constructionism; situated cognition/situated learning; and self-directed learning (Rieber, 2000a, 2000b; Rieber, Orey, & King, 2006). Scaffolding, which predates situated cognition and situated learning as a theory but is included in these concepts, also figures prominently in Studio materials. Finally, flow theory is a feature in the Studio curriculum that bears discussion, especially as it relates to constructivist elements in the first course. While the above perspectives may represent the theoretical core of the curriculum, the set of skills being taught – instructional design and development – is thoroughly rooted in behaviorism (Dick, 1995). A review of these behaviorist roots is, however, beyond the scope of this paper. The following sections will

therefore discuss these major perspectives and related concepts, along with their application in the Studio: constructionism; situated cognition and situated learning; and self-directed learning.

Constructionism

Two clarifications are needed regarding the term *constructionism*. First, in the sense discussed here, it should not be confused with the philosophical orientation known as social constructionism (also called simply constructionism). Social constructionism is an epistemological position (a belief about the nature of knowing) that espouses the socio-cultural nature of all knowledge (Crotty, 1998). While it is true that constructionism, as discussed here, has a strong epistemological dimension (Papert, 1991), it is not an epistemology per se but "a theory of learning and a strategy for education" (Kafai & Resnick, 1996, p. 1). Second, constructionism (with an "n"), as used in this paper, is regarded as an application of principles of constructivism (with a "v"), which is a variant of social constructionism that emphasizes the construction of knowledge through interaction with the environment. All of these perspectives are to be contrasted with objectivism, the belief that reality is external to the knower and that meaning corresponds to objects and categories in the real world. (See Jonassen, 1991, for a comparison of the assumptions of constructivism and objectivism).

The absence of the word "social" with constructivism does not mean that constructivism lacks an emphasis on social interaction. According to Slavin (2003), constructivism draws heavily on the work of Piaget and Vygotsky and includes the key concepts of social learning, the zone of proximal development, cognitive apprenticeship, and mediated learning (scaffolding). In practice, instruction carried out from a constructivist perspective may emphasize approaches

such as cooperative learning, discovery learning, self-regulated learning, and the teaching of problem-solving strategies and critical thinking skills.

Constructionism, as used here, is a theory of instruction introduced by Seymour Papert and first articulated formally in Harel and Papert (1991), though the roots of these ideas were contained in Papert's seminal work *Mindstorms* (1980). These ideas grew out of his work with psychologist and epistemologist Jean Piaget. As Papert points out, constructionism has a strong epistemological dimension:

> Constructionism – the N word as opposed the V word – shares constructivism's connotation of learning as "building knowledge structures" irrespective of the circumstances of the learning. It then adds the idea that this happens especially felicitously in a context where the learner is consciously engaged in constructing a public entity, whether it's a sand castle on the beach or a theory of the universe. (Papert, 1991, p. 1)

Thus constructionism seeks to promote the internal activity of constructing knowledge through the external activity of constructing a representation or manipulation of that knowledge. Constructionist learning environments are therefore those environments that facilitate such activities specifically with the construction of new knowledge in mind. Though Papert himself has hesitated to describe constructionism in any sort of formulaic manner (Papert, 1991, p.1), at least four basic tenets of constructionism have been offered by Bers, Ponte, Juelich, Viera, and Schenker (2002): "(a) learning by designing meaningful projects to share in the community, (b) using concrete objects to build and explore the world, (c) the identification of powerful ideas that

are both personally and epistemologically significant, and (d) the importance of self-reflection as part of the learning process" (p. 123).

Students in constructionist learning environments are engaged in the designing of many kinds of things in a social setting, as explained by Kafai & Resnick (1996):

> Constructionism suggests that learners are particularly likely to make new ideas when they are actively engaged in making some type of external artifact — be it a robot, a poem, a sand castle, or a computer program — which they can reflect upon and share with others. (p. 1)

Student-generated projects are an important aspect of implementing constructionism. Projects can be defined as "relatively long-term, problem-focused, and meaningful units of instruction that integrate concepts from a number of disciplines or fields of study" (Blumenfeld et al., 1991, p. 370). Projects have two fundamental elements: 1) a driving question or problem; and 2) activities that result in one or more *artifacts*. Artifacts are "sharable and critiquable externalizations of students' cognitive work in classrooms" and "proceed through intermediate phases and are continuously subject to revision and improvement" (p. 370-371). More detailed descriptions of applications of constructionism may be found in Harel and Papert (1991), Kafai and Resnick (1996), and Rieber (2003).

Constructionism is relevant to the training of adults in instructional design and development, in which a public artifact is normally produced. Given the nature of IDD as a design activity (Nelson & Stolterman, 2003; Tripp, 1994), constructionism, the essence of which is learning-by-designing, provides a framework for maximizing learning.

Constructionism Applied in the Studio

In the first studio course, participants create a project that is continually open to review and critique by other members of the studio community. Additionally, they complete a web-based, public design journal during the design and development phases of the project. Finally, studio participants in all three courses show and discuss their respective studio projects at the "Studio showcase," the final and culminating event that is open to the general professional community.

It is crucial that participants choose a project topic in the first course for which they are passionate. They are explicitly advised to reflect on their values and interests and to choose a topic for which they are highly enthusiastic and devoted. This is posed as a unique opportunity for the students, that is, to receive graduate credit for pursuing one of their passions. Consequently, topics range from the very personal (e.g. documenting the birth of a child or an important anniversary of parents) to avocations (e.g. gardening, quilting, traveling). Work-related project topics are not off limits, but participants are counseled not to choose a project that will seem like "work."

It is explicitly hoped that students who follow this advice will experience the kind of optimal life experience that Csikszentmihalyi (1990) identified as "flow" during the completion of their projects. Csikszentmihalyi originally defined flow as "...the state in which people are so involved in an activity that nothing else seems to matter; the experience is so enjoyable that people will do it even at great cost, for the sheer sake of doing it" (p. 4). Flow is associated with losing track of time, a sense of momentum, and often a sense of creative productivity (Csikszentmihalyi, 1996). Early in the semester, students are presented with information about flow theory and encouraged to look for this experience in their design and development process.

It may seem overly ambitious to expect graduate students to regard a component of their for-credit work in this fashion; however, Studio participants who have been interviewed as part of several research projects have in fact reported, without exception, episodes of flow in their project work, in many cases losing track of time repeatedly for several hours at a stretch (Clinton, 2005; Clinton, 2006; Clinton & Rieber, 2005).

The first course, with its emphasis on tool and design learning rather than on creating instruction, lends itself well to the constructionist approach described above. As such, it sets the tone for the entire program, and students are expected to put this way of learning to use in the rest of the program as the latitude for managing their work increases. It is true that, because the authenticity of creating instructional products for real clients is a highly valued aspect of the program, the remaining two courses include this authentic aspect (as well as a formal instructional design process) and thereby introduce more constraints on what projects students may choose and how these projects must be carried out. Nonetheless, the constructionist element of creating a meaningful artifact that is shared with one's peers in a self-managed, self-reflective process is maintained throughout the program.

Situated Cognition and Situated Learning

After constructivism, the next most important theoretical construct influencing the studio curriculum has been situated cognition. A seminal article advocating for situated cognition was Brown, Collins, and Duguid (1989). Major concepts in this article included situated cognition, cognitive apprenticeship, scaffolding, communities of practice, legitimate peripheral

participation (situated learning), and enculturation. Brown, Collins, and Duguid heavily cited the work of Jean Lave (see the discussion of situated learning below).[2]

Situated cognition posits that all thinking, learning, and knowledge arise from socially mediated activities embedded in authentic and meaningful contexts. Specifically, situated cognition refers to the embeddedness of a learning activity within a context that may be more or less authentic to the context from which the learning content is derived. For example, Brown, Collins, & Duguid (1989) discussed successful models of cognitive apprenticeship in which classroom instruction was presented by teachers modeling the reasoning processes of mathematics professionals rather than those of typical math teachers. Cognitive apprenticeship is derived from the concept of the zone of proximal development (Vygotsky, 1978).

Situated learning may be viewed as one kind of situated cognition. Also called legitimate peripheral participation, it is a descriptive theory that offers a comprehensive view of the way that learning is socially situated in communities of practice. The theory broadens the idea of apprenticeship into an "an integral part of generative social practice in the lived-in world" " (Lave & Wenger, 1991, p. 35). In this view, life, or at least social life, does not proceed without learning (see also Dewey's exposition of the educative nature of social interaction, Dewey, 1916). The central focus of this theory is social practice itself, of which learning is a natural outgrowth. The social context is primary. Put another way, learning is first and foremost a process of social participation, and secondarily a process of acquiring knowledge or skills. Learning is "an increasing participation in communities of practice" (p.49). From this kind of perspective, even solo individual learning, as pointed out by Salomon and Perkins (1998), may

[2] Interestingly, the book *Situated Learning: Legitimate Peripheral Participation* (Lave & Wenger, 1991) was cited in Brown, Collins, & Duguid (1989) as "Lave and Wenger, in preparation."

be regarded as covertly social and may be part of learners' peripheral participation in a practicing community.

Following are some key points about legitimate peripheral participation (LPP) within situated learning:

- In five apprenticeship contexts examined by Lave and Wenger (1991), in the successful cases, there was little observable teaching but a great deal of learning.
- "Peripheral" is directional; the learner is assumed to be moving gradually toward "full participation."
- LPP is a process of gradual enculturation into a community of practice, of moving from newcomer status to old-timer status.
- Lave and Wenger (1991) insisted that the dualities of legitimate/illegitimate, peripheral/central, and participation/non-participation have no useful meaning for this view of learning. The "center" of practice is not defined. "Rather, "full participation" is the preferred term.
- Lave and Wenger (1991) avoided issues of inequity and social justice for the purposes of the book. Their concern seemed to be with typical social systems rather than all variations of social contexts. However, the relation between newcomer and old-timer was acknowledged to involve relations of power.

The concept of scaffolding is generally credited to Jerome Bruner and colleagues in the 1970s (Wood, Bruner, & Ross, 1976). Scaffolding is based on Vygotsky's (1978) concepts of the zone of proximal development (ZPD) and the more knowledgeable other (MKO). According to these concepts, the best learning happens in the area just beyond what the learner is capable of on

his or her own; a person with more knowledge can provide the necessary assistance for this learning. The ZPD is defined as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers" (Vygotsky, 1978, p. 86).

Bruner's variation on this theme focused on the issue of support. As the metaphor from building construction suggests, scaffolding describes support for learning that is gradually removed, or faded, over time. Fading is an integral component in scaffolding (Pea, 2004), which is commonly applied in individual teacher-learner interactions but may also logically be built into the overall design of an academic program.

Situated Cognition and Situated Learning Applied in the Studio

A key example of situated cognition in the IT@UGA Studio is the legitimate peripheral participation experienced by each student over the life of the program. While many graduate programs exhibit elements of legitimate peripheral participation, the Studio curriculum makes this explicit by creating a specific and highly valued community of practice within the larger master's program, one in which the progression from newcomer to experienced citizen is made transparent to students from the beginning. Not only is this process outlined in the Studio Handbook, which serves as the "constitution" for the entire program and is read by all students; it also unfolds with each semester in a new cycle before the eyes of every student.

One wouldn't want to overstate the centrality of the project teams in the final Studio course within this community; the "full participation" described by Lave and Wenger (1991) can take other forms – notably with those students in the first two courses who take ownership of the

community aspect of the experience and are seen as "going the extra mile" when helping others. Nonetheless, the final course is the culminating course of the program and the project teams represent a more defined "center of practice" than might be present in most communities. As such, the team project experience is clearly identified from the outset as the target experience for which participants should be preparing as they work through the earlier stages of the program. Students enrolled in the first course listen to various presentations delivered by the project teams to the community and are required to sit in on several of the team meetings, submitting notes as evidence of their participation. When they move into the second course, they are drawn more deeply into the team experience by serving actively in the role of consultants. In this role, they contribute to the team projects in a serious and direct way, providing up to 20 hours of "billable" time. The duties of each consultant are (or should be) clearly defined by the respective design team. They also attend many of the design team meetings in order to understand the context of the project. They are expected to perform this consulting role in a timely, professional fashion, but the responsibility of the team project's ultimate success or failure is not theirs. Still, they experience the emotion — high and low — that accompanies the team's progress. Along the way, they are expressly told to note examples of good and bad team practices in order to be prepared for their own role as team members in the final course in a subsequent semester.

The principle of scaffolding, as incorporated into situated cognition, is a particularly important component in the Studio's design. The overall "scaffold" of support fades slowly over the three-course sequence. It is strongest in the first course, but even here students are expected to make decisions about their learning path, with help and advice from the instructor. In comparison to a traditional graduate course, participants in the first course have much latitude, but not nearly as much as they have in the second course, nor, especially, in the final course.

A good example of scaffolding in the Studio occurs in the first studio course. Here students begin to learn a variety of multimedia tools in order to develop initial skills for use throughout their studio and masters experience. Students are not forced to learn the same tools, but instead submit a contract for their tool learning at the start of the semester. The instructor provides several sample contracts from which most students build their own personalized contract. Each contract includes a description of the skills to be acquired and also the resources that will be used to learn the tool, the most typical of which is a "how to" textbook. The instructor (and sometimes more experienced students) also conducts a series of workshops on the most common tools, though it is explicitly made clear that these are meant as merely an introduction to the tool and are not meant as a substitute for serious self-directed study on the part of the student. At mid-semester, each student meets one-on-one with the instructor to conduct an individualized "performance review." The student demonstrates his or her understanding of the tools contracted to learn to the satisfaction of the instructor by completing various tasks "on the fly," that is, while the student works on the computer with the tools up and running. The purpose of this performance review is to ensure that the student has made progress in their skill building. The performance review is obviously a cause of some concern by students during the first part of the term, which helps to motivate them. Although a time-consuming process, this review is a very authentic and effective evaluation – it is very clear within a surprisingly short period of time whether or not the student has become at least modestly proficient with the contracted tools. Those who do not perform as well as they should are given clear formative feedback on what work needs to be done in the short-term with a follow-up review scheduled for a few weeks later. This contractual approach within the context of the highly personal performance review gives the student enough structure to help them build

sufficient proficiency to complete a project while also modeling a learning model based on self-direction. These scaffolds are deliberated faded in the second half of the semester. Students have shown they can effectively continue to enhance their tool skills, as well as develop new skills, in their remaining studio courses using this self-directed learning model.

The fading element of scaffolding is also evident in the level of support given to project teams in the final course. Given that the culminating learning activity of the program is very intensive, the instructor for the final course is faced with the challenge from week to week of deciding how much active support to provide. Group sessions are needed at the beginning of the semester to clarify the task at hand for students, facilitate team formation if needed, present due dates and documentation requirements, and review key concepts such as elements of teamwork and the importance of good performance objectives. However, with the volume of work that teams must manage from week to week, it becomes evident very early in the semester that the teams need to be pulled away from their work as little as possible. Students who have passed through the program up to this point should, in theory, be well equipped to tackle the final team project for an external client, and this is consistent with the intent of fading support gradually over the entire program. Specifically for this course, then, instructional sessions should be scheduled only in response to a clear need. In practice, the needs of the teams vary from semester to semester depending on students' collective levels of experience and skill. Needed areas of additional instructional support have included, for example, task analysis and prototyping strategies.

Self-Directed Learning

The third major theoretical construct associated with the Studio is that of self-directed learning. Noting the strong behaviorist element in the roots of instructional technology, it may be appropriate to begin here by drawing a distinction between self-regulated learning, a concept of specific learning activities rooted in behaviorism, and self-directed learning, a broader constructivist perspective relating to learner autonomy. Simply put, self-regulated learning normally refers to well-defined behavioral strategies for reaching short-term learning goals, while self-directed learning refers to a learner deciding what to learn and how to learn it, what end-product will suffice as evidence of the learning, and when this goal has been reached (Moran, 2005). Self-directed learning, with its longer-term focus, has also been called a way of life (Brockett & Hiemstra, 1991). It is often illustrated with examples of adults who become interested in a particular topic or activity outside of formal education and who take the initiative to make learning happen about that topic.

The concept of self-directed learning has been enormously influential in adult education. By the early 1980s, Brookfield (1984) had concluded: "By almost any conceivable measure, research into self-directed adult learning must constitute the chief growth area in the field of adult education research in the last decade" (p. 59). Candy (1991) attributed the modern origins of self-directed learning research to the work of Cyril Houle and Allen Tough in the 1960s. However, the processes and conditions of self-directed learning have been described as a major force in human life since ancient times (Brockett and Hiemstra, 1991).

Brockett and Hiemstra (1991) presented a model for self-directed learning called the Personal Responsibility Orientation (PRO) model. Their model distinguished between two major facets of the concept, one describing the "characteristics of the teaching-learning transaction"

(self-directed learning) and the other describing the mindset of the learner (learner self-direction).

Candy (1991) took the concept of self-directed learning a step further by dividing each of the main facets into two additional subcategories. The learner's activity or method of self-directed learning may either be true autodidaxy (self-education, with no reference to an instructor) or assisted autodidaxy, also called independent study, in which an instructor still maintains some degree of control. Likewise, the goal of learner self-direction may refer to the learner's capacity for self-management (similar to self-regulated learning) or the learner's personal autonomy in the sense of choosing one's direction in learning (Candy, 1991).

As an approach to instruction, SDL presents an apparent paradox: self-direction implies learning alone, without the aid of an instructor or facilitator. However, those who work with adult learners can do many things to help promote SDL in their learners, including assisting with planning, providing feedback, and locating or coordinating available resources (Brockett & Heimstra, 1991).

Self-Directed Learning Applied in the Studio

In the first studio course, seminars and discussions are held specifically to address the nature of self-directed learning. These become very personal in the sense that participants are asked to tell stories of self-directed learning in everyday life. A main point of these discussions is that, as adults, everyone has had countless self-directed learning experiences because that is how most of the important lessons of life are learned. Something seems to happen, however, when one crosses the threshold of school — one becomes or takes on the persona of a student, a persona learned over a period of at least 16 years of formal schooling (a typical period for most graduate students). This persona is usually accompanied by feelings of needing or wanting

complete direction and control by the instructor. If direction is not provided, discomfort and frustration often follow, usually because the concept of self-directed-ness is interpreted as "I need to learn this all by myself without help." Indeed, in the Studio there tends to be an expectation that the instructors will be able show step-by-step and in a fixed sequence how to use a multitude of multimedia tools and apply design principles in such a way that all participants will be able to create exemplary projects (Fiedler, 1999; Song & Hill, 2004; Clinton, 2007). There is an assumption that there is one "best way" to learn these skills suitable for all learners. But, like many important life skills, these multimedia skills are multi-faceted, complex, ill-structured, and determined in large part by the nature and context of the design problem or project. The seminars and discussions about self-directed learning help to reveal the incompatibility and incongruence of the desire for a simple directed learning experience within a complex learning and working context, such as that of designing a multimedia project.

As the first course unfolds, participants begin to see that self-directed learning is not about "going it alone," but instead is about making choices and decisions, followed by taking action. Some actions include going to organized workshops that present a subset of skills in a structured way. Other actions include making appointments with instructors or more capable peers for individual tutoring or help. Slowly most participants seem to realize, sometimes only over the duration of the three courses, that the diversity of the people and needs dictated by the projects results in a similar diversity of learning paths and that no instructor could possibly organize any "best route" that would meet all the competing needs and expectations. Most students leave the graduate program comfortable with a learning approach that will serve them well as a practicing professional. Even for those for whom the studio approach does not work well, at least they have experienced a different model for how "school" might be conducted.

A Review of the Studio Experience: 10 Years of Implementation

The studio curriculum was designed to embody the most contemporary theoretical constructs touted by scholars in the field of instructional technology. We have tried to "walk the walk" and not just "talk the talk." If scholars advocate that these theories of learning and instruction should be adopted and implemented by educators and trainers in their respective professional settings, then surely these same theories should be able to guide graduate education within the instructional technology field itself. So, the effectiveness of the studio curriculum should be as robust as the theories themselves, given the assumption that the theories have been implemented with reasonably high fidelity. However, it is fair to ask what evidence exists to back up our claim that the studio curriculum deserves legitimacy as an approach to graduate education within the field of instructional technology. Of course, it is equally fair to ask what evidence backs up the claim that the one-course/one-instructor model deserves any more legitimacy beyond the fact that it has been in place for so long. Like any teaching experience, the decisions related to curriculum scope and pedagogy are best viewed as resting on a combination of information, rationales, and skills available to the instructors. All are situated within the culture of the educational environment in which they are made. Like all good university instructors, we have sought continual feedback from our students in combination with an evaluation of their performance, such as the quality of the projects they have submitted each semester. Student feedback has come from a variety of sources, such as instructor-prepared student evaluations and student debriefing sessions (individual and group). Feedback has also come, along with other kinds of data, from research projects conducted within the Studio learning environment (see below). Other student feedback has been obtained in unsolicited ways

from students who cared enough to send feedback on their own. Data derived from these sources have been the basis of changes to the studio's design over time.

Research Informing the IT@UGA Studio Program

Along with course evaluations and other forms of student feedback, data from formal and informal research efforts have also informed program decisions and enriched the experience of students in the Studio program. A total of five formal and two informal research efforts on the Studio program have been conducted and written up thus far in its ten-year history (two additional dissertation studies are in progress at the time of this writing). Much of this work has been chiefly concerned with student feedback on the quality of their experience, offering positives and negatives and suggestions for change (Fiedler, 1999; Orey, Rieber, King, & Matzko, 2000; Song & Hill, 2004). More recently, studies conducted in the Studio environment have focused on the Studio as a community of practice (Holschuh, 2006) and the role of creativity in the design and development experience of students (Clinton & Rieber, 2005; Clinton, 2006; Clinton, 2007). Two of these have been completed dissertations (Holschuh, 2006; Clinton, 2007). While none of these studies have been published in peer reviewed journals as of this writing, the data presented in them has nonetheless been of great interest to Studio instructors. Table 2 presents a tabulation of these studies, their basic characteristics, and highlights from their findings.

Table 2. Studies Conducted in the IT@UGA Studio Learning Environment

Fiedler (1999)	
Focus	Student feedback
Methodology	Informal interviews with fellow students; reflections of author as student
Research	"The purpose of the paper is the exploration of the "psychological" tasks

Questions or Purpose	that the self-organized learning aspects of the Studio entail, how the structure of the Studio supports the learners in their attempt to cope with the demands of such an environment, and what could be done to improve the learning process and the structure of this particular learning environment" (no page #).
Participants	"a small number of explorative interviews with other participants, and countless informal conversations"
Highlights from Findings	Major cognitive tasks need more support; constant review and improvement of support structure is needed in order for the Studio to survive as a program
Orey, Rieber, King, & Matzko (2000)	
Focus	Student feedback
Methodology	Informal collection of student feedback via online discussion threads and questionnaires
Research Questions or Purpose	"The focus of this project is on implementing a constructivist approach within the context of our graduate program. Part of the implementation is to determine how the implementation is working for the students" (no page #).
Participants	23 fall semester students and 31 spring semester students from all Studio course levels
Highlights from Findings	Postive feedback and suggestions for improvement fell into three broad categories: 1) The Studio Culture – Students liked having access to more than one instructor; students valued the cross-interaction between course levels; first-course students appreciated the autonomy afforded to them to choose tools they wanted to study and which workshops they would attend; students responded positively to guests brought in from the field. 2) Communication – Students called for more face-to-face interaction and specifically asked for more required class sessions; students did not find the (at that time) required WebCT electronic discussion board participation to be very meaningful; students called for a more robust people-database, though there was no general agreement about features to include; the vulnerability of seeking formative project feedback from peers was a major obstacle for some students. 3) Structure – Students in the first course wanted more structure and more guidance on choosing what tool to study; second course and final course students did not want more structure; students wanted more specific workshops on their tool(s) of choice; students wanted more objective criteria for grading projects; students didn't like being graded on their online discussion board participation.

Song & Hill (2004)	
Focus	Student perspectives
Methodology	Qualitative interview study
Research Questions or Purpose	"The researchers obtained data regarding students' perceptions of their overall learning. … We also sought to gain an understanding of the learners' sense of the learning community, and their suggestions for the instructors and future students of the Studio" (p. 4)
Participants	8 interviewees from all Studio course levels
Highlights from Findings	Student responses "mostly positive with some challenges" (p.15); community "overall connected yet separate" (p. 15); recommendations for instructors – more structure, more scaffolding; recommendations for students – actively seek help, expect learning curve, time management, work together
Clinton & Rieber (2005)	
Focus	Creativity & flow in student experience
Methodology	Mixed methods – questionnaires, document analysis of design journals
Research Questions or Purpose	"1) What are the characteristics of "flow" experience among adult learners participating in a constructivist design and development tools training environment? 2) What are students' perceptions of creativity as it relates to design? 3) How does a learner's perception of his or her own creativity influence the learning experience?" (no page #)
Participants	9 participants enrolled in the first course (summer version)

Highlights from Findings	▪ All students reported experiencing flow
	  ○ 30 minutes to 4 hours
	  ○ "fun," "in the zone," "time doesn't exist," etc.
	▪ Students who were concerned that they lacked creativity were the ones who initiated the topic of creativity in their design journals
	▪ "Creative self-efficacy" appears to be related to student success in the course; however, all students gave positive evaluations of their learning experience

Clinton (2005)	
Focus	Creativity & flow in student experience
Methodology	Qualitative interview study
Research Questions or Purpose	1) What are the characteristics of "flow" experience among adult learners participating in a constructivist design and development tools training environment? 2) What are students' perceptions of creativity as it relates to design? 3) How does a learner's perception of his or her own creativity

	influence the learning experience? In what ways does the learning community support the experience of flow and creativity among students?
Participants	3 interviewees enrolled in the first course
Highlights from Findings	Students viewed themselves as creative individuals and viewed the Studio as fostering creativity at some level; students called for more support for tool learning and more scheduled, open computer lab time with less lecture; all three students described episodes of flow in their design work (ranging from 30 min. to 6 hours); the seeds of flow may be planted within the group, but flow happens when working alone; flow is conducive to creativity but not always productive.
Holschuh (2006)	
Focus	The Studio as a community of practice
Methodology	Micro-ethnography
Research Questions or Purpose	"1. How do theories of communities of practice explicate the way students engage in and negotiate design of an authentic design project within a team-based context? 2. How is the way in which students conduct design within a team-based context influenced by the design-studio model? 3. How do students come to identity themselves as members of the culture of designers in the design team, in the Studio, and in the larger cultures of instructional and multimedia designers? Where and how is value assigned within this culture?" (p. 6)
Participants	3 members of a project team in the third course (in the context of the wider Studio environment)
Highlights from Findings	Aspects of community in the Studio included both designed and emergent aspects; certain students served as peer masters and instructors for newer students; students identified themselves variously as designers, developers, teachers, and IT professionals. Recommendations: increase rigor through instructor-led design critiques; foster the role of peer masters; follow up with students after they leave the program.
Clinton (2007)	
Focus	Creativity in student design experience
Methodology	Mixed method – case studies (interviews, document analysis of design journals), correlational study (creativity assessments, questionnaires)
Research Questions or Purpose	"1) What relationships can be found between: a) self-rating of personal creative ability by program participants; b) participants' composite scores on the Torrance Tests of Creative Thinking – Figural (TTCT:F); and c) ratings of participant projects by a panel of experts? 2) What does the design process of individual students look like? 3) What are participants' perceptions of creativity as it relates to their project work?" (p. 81)

Participants	5 students from the first course (case studies); 17 students from the first two course levels (correlational study)
Highlights from Findings	Quantitative data indicated that the seventeen individuals: a) were highly creative relative to the general population; b) generally viewed themselves as creative persons; and c) created multimedia projects that were rated as fairly homogenous in creativity by two experts. Five case studies described students who enter the program having more skills with the multimedia development tools, who tend to view themselves as creative, generally thriving in the program. In contrast, case study participants who lack these initial skills may view themselves as less than creative and generally experience frustration in the program, needing additional support. All five case study participants affirmed that creativity is necessary for good design.

It is beyond the scope of this paper to list all of the findings of the studies in Table 2. All have included both positive and negative feedback from students. All have highlighted the uniqueness of the Studio program among the college experiences of students. Meantime, certain data, either from ongoing student feedback or from specific research, do bear mentioning that have led to specific adjustments in the program. These will be discussed in the following sections.

Quality of Student Projects

We are not prepared to claim that student projects created in our Studio environment are superior to projects created in the one-course/one-instructor model. But, based on instructor evaluation data, the huge majority of projects submitted have met the evaluation criteria specified at the start of the semester. One significant difference the instructors have noted is that in the Studio there are community expectations as well as instructor expectations. That is, because participants continually see and review the projects of their peers, the expectation for higher quality projects has naturally been raised among the participants themselves. Peer

critiquing of projects reaches its conclusion each semester with a peer-led award for excellence called the Blue Sock Award, and many students appear to highly value this award. However, sometimes the peer pressure has negative consequences. For example, a student who is taking the first Studio course should not feel that they must have the same skills as a peer taking the final Studio course, yet this attitude many times prevails, creating a negative personal perception. In the Studio, we often use past exemplary student projects as a source of design ideas and inspiration and this can exacerbate this attitude. Although we have confronted this negative perception within Studio class meetings, it is a difficult perception to change once established. The positive side of this is that it also serves to challenge a student to their very best because they know their peers will be critiquing their work.

Not surprisingly, novice students are prone to pay attention more to superficial aspects of a project, such as its graphic design, than its deeper design components, such as its organization and the nature of learner engagement. Students often compare themselves to their peers on these superficial dimensions. We would not be the first to point out that an area of weakness among educational multimedia in the profession is in the area of learner interaction. As a way to promote more creative designs in which learners are engaged in meaningful and challenging activities within a multimedia project, the studio instructors recently have instituted a studio award called the "Creative Interaction Award." We hope this helps to motivate our student designers to consider more carefully the way in which they design learner interactions.

Instructor-provided structure

The question of who decides what will be learned and by what means is a contentious one in the constructivist literature. Radical constructivists oppose most top-down structure, whereas

the literature on scaffolding accepts the need for structure at the beginning of a new learning experience, though with the caveat that the structure be faded as the student gains expertise. When the studio was first implemented in 1998, the studio instructors opted for a minimalist position on structure. Except for a few special events, such as the studio orientation at the beginning of the semester and the studio showcase at the end, attendance at all other events was optional. The idea here is that if a student has already mastered a skill to be covered in an upcoming class or workshop, or simply has no need for that skill in their project, the student should not be "held hostage" by being forced to attend. The instructors prepared and conducted a wide collection of optional skill workshops and design seminars with the understanding that students would attend those they felt were relevant to them. This approach, though having a strong theoretical rationale, did not work well in practice. We found that students did not make good choices about when to attend. Interestingly, many students, even those who ironically opted not to attend, voiced the opinion that they wanted more mandatory classes, as exemplified by the student letter shown in Table 3. Ultimately, we settled on a structure where attendance is required by all students for approximately the first half of the term.

Table 3. Letter from a student

Hello Dr. Rieber,

Per our conversation, I would like to make following comments and recommendations for the Studio classes. As a graduate student in IT I have already taken two semesters of EDIT 6190 and one semester of EDIT 6200.

I recommend mandatory classes for the three studio courses from 5:00 to 8:00 / 9:00 pm on Thursday up to the mid-term of each semester.

Why?

> Part of the rationale behind studio classes is to facilitate student learning by interaction amongst each other (It should be clear to you that much of your experience depends on you and your peers). Coming to a class from 5:00 to 8:00 / 9:00 in the first part of semester will greatly enhance this objective. It will be a place for EDIT 6190, EDIT 6200, and EDIT 6210 students to come to know each other, share their experiences, ask questions and work on their respective projects. It seems that students have more time at the first part of each semester for exploring and experimenting with different ideas and learning tools.
>
> The pressure of finishing the project and course requirements usually mounted at the latter part of semester. For this reason, this mandatory class should be held in the first part of the semester.

One instance of research data that led to specific changes in the Studio curriculum concerns the way that service hours are fulfilled by students in the final course. All students at all levels must fulfill ten hours of community service per semester. Normally this service is rendered to not-for-profit entities external to the Studio, such as local organizations or other departments in the university. However, in a dissertation study, Clinton (2007) found that the first course tends to attract a significant number of students who lack the expected background in multimedia skills (an enrollment choice that is left up to students, though all interested students receive strongly worded written advice about taking a basic technology course first if one lacks this background). Not surprisingly, these students are generally the ones who don't adapt as well to the self-directed learning aspect of the Studio and express the need for more structured instruction. Clinton (2007) recommended instituting a change in which final course students are required to dedicate their service hours specifically to mentoring and tutoring of their junior peers. While mentoring has always been a part of the Studio culture, this new change moved a certain amount of the mentoring from the realm of the voluntary to the mandatory, helping to

ensure a higher overall level of mentoring each semester. An organized approach to this change was instituted in the fall of 2007.

Conclusions

Creating effective educational multimedia requires many people with many skills, talents, and experiences. The abilities needed to complete a successful project are necessarily distributed across the development team. Examples include knowledge of the subject matter, project management, instructional design, evaluation, graphic design, and a wide array of computer tools (authoring/programming, graphics, animation, etc.). The increase in (and diversification of) Web-based forms of instructional materials further complicates this design process, requiring not only another layer of technical sophistication, but often complete rethinking of how instructional materials ought to be designed. At the core of all of this is a creative and collaborative problem-solving process in which members of the team must somehow learn how to work with and rely upon each other.

Unfortunately, graduate programs that prepare people to join these development teams rarely teach this way. Even the most innovative of instructors have difficulty providing their students with authentic and collaborative design experiences under the constraints of the one-course/one-instructor model. All faculty who are serious about their teaching struggle with these problems, but are usually stymied in how to initiate change in their departments or colleges. After all, universities are not known as champions of change when it comes to teaching.

The Studio curriculum at the University of Georgia has been operating since 1998. Its design was strongly influenced by contemporary learning theory. We feel it is a legitimate

example of how to model a constructivist epistemology in an adult learning environment. A great mistake that is often made when interpreting and analyzing applications of constructivism to education is that it is synonymous with discovery learning and that instruction is the antithesis of such a philosophy (see Kirschner, Sweller, & Clark, 2006, and Mayer, 2004, for examples of this misconception). In contrast, a mature constructivist view looks to understand when instruction is not the most appropriate route to learning, or conversely, when instruction is most needed for learning to occur (Bransford, Brown, & Cocking, 1999). Understanding the difference is probably the most challenging aspect for any teacher in a constructivist learning environment. A constructivist teacher is not interested in the quickest learning if this means that learning will remain shallow and decontextualized. Finally, even if a constructivist approach to learning, as embodied in the IT@UGA Studio, is not the best approach for every single learner, it is significant that it provides at least one contrasting model of education for the adults who experience it.

Public education, allowing the free exchange of ideas and the "initiative and adaptability" of individuals that Dewey articulated (at least at times), is viewed as a key ingredient in the survivability of the new American democracy that was formally signed into existence in 1787 (and ratified in 1789). It is our hope and anticipation that the IT@UGA Studio program, as a new instructional endeavor at an academic institution, will also continue to grow, adapt, and flourish in a way that fosters these qualities and is responsive to its citizens as they pass through the program.

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