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Evolving Into Studio

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Abstract

Instructional design is practiced in a real-world setting; it should be learned in a setting like the one where it is practiced. As the practices themselves change, it becomes more natural for this to happen. This study of one design instructor's experience over nearly 50 years demonstrates a path of evolution out of teaching design in a standard classroom, in which practice is secondary to didactics, into a studio setting, where didactics tend to occur after the student has experienced a need.

This study uses the changing landscape of instructional design from about 1970 to show why training that includes studio experience is becoming a new imperative. I will describe four historical stages in the evolution of the designer's working environment to illustrate how design has acquired a more social aspect than ever before. Today's emerging views of design are more likely to take into account how expert designers think and how teams work together collaboratively. In a changed professional world, studio training has become a new standard: one that supplies many of the intangible skills that can no longer be taken for granted.

The Evolution of Instructional Design

Knowing where design and design training should go depends on where it has been. My personal view of the past is framed, of course, by my own experience. For me, the evolution of instructional design as a field of practice can be summarized in four general phases:

- A revolutionary phase in which the idea of designed instruction was fresh and new and began to form into a body of practice.
- A tooling phase in which computers and authoring tools became the "new, new thing".
- An expansion phase in which the emphasis turned to serious new instructional forms that used more of the computer's power and escalated the demands on the designer.
- A new design phase in which design thinking and design logic are replacing the process, the tool, and the device as the most important problem.

The Revolutionary Phase

Following WW II and the Korean War, training system designers with years of experience in man-machine system design with the military and government joined university faculties. One of these, Robert Gagné captured the expertise gained from this experience (1965a, 1965b) and translated it into terms that educators could relate to (see also Gagné 1970, 1977, 1985). A close colleague, Leslie Briggs, wrestled with the problem of integrating programmed instruction with teacher-led instruction in the classroom. He first focused on this as a media selection problem (Briggs, 1967) and then recast it in larger terms of systematic processes for the design of instruction (1970). Others saw that this filled a knowledge void and wrote several additional descriptions of systematic development processes (see Andrews & Goodson, 1980). Among these was a handbook for all military services called the "Interservice Procedures for Instructional Systems Development (IPISD)" (Branson et al, 1975), from which the acronym ISD was derived.

Over time, these ideas, along with taxonomies of educational goals introduced by Bloom (1956) and Gagné (1965), came to dominate thinking on educational product development for the field that came to describe itself as Educational Technology (Ely, 1963; Association for Educational Communications and Technology, 1972; Seels & Richey, 1994; Januszewski, 2001; Januszewski & Molenda, 2007). The trend of these ideas was an emerging focus on the development process, formulas, and simplification so that a wider audience of developers could be empowered. Another leading figure of this time, Robert Glaser, focused instead on research in to the learning processes and became the co-founder of the Learning Research and Development Center at the University of Pittsburgh (Steele, 2006). This provided the seed for the Learning Sciences movement.

In their time, the ideas of Gagné, Briggs, and the others were revolutionary. The military market for these ideas had already been established, but now they were poised to engulf commercial and corporate development as well. Initially these ideas had to be digested and tested under titles such as SET (systems engineering of training) and SAT (systems approach to training) through government-funded projects. These projects demonstrated that process models were a useful management tool for keeping projects manageable and predictable in terms of budget and timeline, as well as producing instruction of acceptable quality. My own experience with some of these projects gave sufficient evidence to make me a disciple, and I spent the first five years of my career teaching systematic process models to military-civilian ISD teams and then applying the process with these teams to create large bodies of instruction.

Turning development into a process made it possible for large teams of subject-matter experts to produce instructional materials according to templates designed by a trained designer—me—who was supplied by a contractor. This gave maximum leverage to the customer at a minimum cost. The government was also trying the alternative, a large contractor-owned development workforce using the same systematic approaches, but that was proving more costly.

I was prepared to be captured by the systematic approach by my work as a graduate student on the TICCIT project (Gibbons & O'Neal, 2014), which also used a template approach for large-volume production of computer-based instruction for junior college use. TICCIT was an NSF-funded project aimed at proving the minicomputer as an instructional device. At the same time, NSF and other government agencies were funding an alternative mainframe computer system, PLATO, which assumed neither systematic development nor template instructional formats (Alderman et al, 1978).

Systematic design ideas were revolutionary at the time. They provided an alternative to hand-made, instructor-produced, one-of-a-kind instructional products. They described an approach to instructional design and development that for decades afterward became the gold standard in the military, industry, government, and commercial development firms. Unfortunately, because they reduced the need for critical, insight-producing thinking, they diverted attention away from the deeper issues of design. For a more lengthy account of the spread of these ideas and their impact, see Gibbons, Boling & Smith (2013), and Smith & Boling (2009).

The Rise of Tools

A key turning point for me and for the systematic approach came with the marketing of the first IBM personal microcomputer in 1981. After this, anyone could create whatever the programming tools would allow. The rapid proliferation of newer and more powerful PCs and PC-compatible software packages made every user an experimenter, and an experiment that occurred to almost everyone was the possibility of instructional use. A large audience was already familiar with the PLATO system (TICCIT had much less effective public relations, and PLATO had several years' of a well-funded head start), and the authoring pattern for PLATO was that every university instructor could also design and build instruction.

Everyone could be a designer, but everyone couldn't be a programmer, so almost immediately application development tools began to emerge that took the pain out of programming. This extended the reach of the user, but unfortunately it also limited the options available to the developer. Moreover, instruction created tended to mimic classroom and textbook delivery styles. Attention of designers was taken up with learning to operate the tool, so there was little time to devote to the deeper issues of design. Even formalized design processes tended to suffer. The new tool-using designer was interested in "keyboard development"—just getting going, making something with the tool—and was not versed in systematic development procedures. Fairweather and Gibbons (2000) referred to this as an instance of the “one step forward and two steps back” phenomenon that has since marked each major advance in computerized instruction.

Some computerized development tools like TUTOR (Sherwood, 1974), and TenCORE (2015) preserved the character of program code, but in order to simplify programming further, many software producers incorporated simple program constructs into their development tools. The most common architectural structure was the “frame”, which consisted of a display component and a logical behavior component. Together, these two parts of the frame could display information in some audio-visual form and then respond to different kinds of user input. Again, I had become well acquainted with this structure through the TICCIT project. Moreover, I worked after 1980 for a company that built computer-based instruction systems, including authoring software. It was inevitable that I should become a devotee of the frame-based authoring system, learning to use it at the connoisseur level, because I had to demonstrate its power to potential clients weekly. As I made this new commitment, however, I did not forget the systematic procedures of the revolutionary period. I still practiced them, but I had to do it in private, out of the customer’s view, because my employer’s product was different now.

The Rise of New Artifacts

In the early 1980s, the customers for whom I demonstrated my tool authoring tricks had in most cases never seen nor imagined the computer as an instructional tool, so there was a need to demonstrate a wide variety of ways the computer could be used. This pushed me and trained instructional designers working for competitors to begin pushing upward expectations of the computer-based instructional product that had already set at a low level. We began to imagine new kinds of application that could be built using the tools we had, which were also on an upward escalation path as customers, now awakened, became bored with yesterday’s idea.

We were under pressure to find ways to build old artifact types using the tools we had, and new artifact types had to be invented. This forced us to keep inventing. We pushed against tool barriers, but we also had to be able to make the case for the effectiveness (or the efficiency) of our artifacts, so we became aware of what our formulas and systematic procedures could *not* do.

This was a defining time that I, and many of my colleagues, had to face questions for which we had no answer. Was our product idea in fact more effective? How did we know this? Was computer-based instruction more effective? How did we know this? Did systematic design procedures produce more effective instruction? If instruction was more effective, was it the result of the computer, the authoring tool, the instructional approach, or the design approach?

For me, the answer to these questions began to revolve around a particular type of instructional artifact that I had found effective, efficient, appealing to customers, and innovative in its demands on the design process. It was the intelligent simulation, which I still believe today to pose one of the most demanding design challenges in all of these categories.

Designing simulations presented me with a forced choice. I discovered that systematic design procedures had little to offer to a simulation designer. They tended to funnel my choices toward direct instruction tutorials and made it hard for me to know just how to approach design. The familiar thread of the didactic narrative—the "presentation"—was not an element in simulation design. What was missing in process models? (See Gibbons, 2003 and Gibbons, 2014 for my current answers.) Moreover, I was confronted with the question, still being asked today by the Learning Sciences: What is the active ingredient that makes the essential difference during instruction (see van Lehn, 2003; Clark, active ingredient, 2009)?

In a major change of direction, I took an academic position, seeking grounding for the answers to my questions.

Where was I at this point? I had discovered that the revolutionary systematic procedures of the 1960s, though useful in many ways, were not applicable in all situations. I had discovered that formulas and taxonomies delivered efficiency but did not even come close to covering the full range of learning needs, types, situations, and design problems. Robert Gagné also realized this, as he continued his search for a more universal set of learning outcome types (see Gagné et al, 1971, Chapter 5).

Instead, I had come to the conviction that the critical issues of instruction were centered on principles for making the kinds of performance and practice environments made possible by instructional simulations. At this point I became model-centered in my thinking (Gibbons, 2001, 2003). I began to believe that the core of a design consisted of some kind of interactive model. At this point I was having my students read *Ender's Game* (Card, 1994).

I had also discovered that interdisciplinary teams working together were imperative because of the growing complexity of virtually all of the technologies involved in design. I had lost a lot of my designer arrogance.

The Rise of Design

The study of design has become for me, and for many of my academic colleagues, an important research pursuit, but the "design" term as it was used during the days of revolution did not mean what it means now, because, as we are discovering, deliberate design of interesting artifacts is a much more complex activity. I believe:

- We have to describe anew what we design
- We have to describe anew how we design
- We have to describe anew what is/can be created by designing

What we design is defined in terms of what we know *can be* designed (individually, not collectively). Boling and Smith's concept of *precedent* is important (Boling & Smith, 2011). Designers draw on the sometimes nameless terms of design languages (Waters & Gibbons, 2004; Gibbons & Brewer, 2005; Gibbons, 2014) that represent their store of mental concepts. These define the boundaries of their design range. Teaching these subtle concepts—helping the design novice to realize that they even exist—is a greater challenge than a textbook and a classroom lecture can handle. This is a strong argument for studio instruction that will be examined in the next section.

How we design is becoming an increasingly frequent topic of discussions. One source of new perspective for instructional design is the design practices of neighboring design fields, including architecture, business, medicine, computer science, engineering, the arts, and technology—design fields that Simon (1999) says have been neglected by the academy. The growing field of design studies accepts as a basic premise that there exists some degree of underlying commonality among design fields that can be studied in an interdisciplinary manner. What then differs between design fields is discussed by Schön (1987; See Table 1, pg. 59), who shows how some design terms are shared *between* fields, but that others are *unique* to a field. The implication is that there may be theories of design in general (Simon, 1999); Schön, 1987), but there may also be theories that are domain-specific (Gibbons, 2014).

The question of *what is created* as we design—the nature of designs—has been given scant discussion. Examples include a discussion of computer designs by Blaauw and Brooks (1997), Dorst's discussion of design frames (2015), Alexander's discussion of design patterns (1964, 1977), Schön's examination of the evolution of a design (Schön, 1987), and work I have done on design layers (Gibbons, 2014). Boling and Smith's work on design precedents is also in this vein (Boling & Smith, 2011). The lack of discourse on this topic creates problems for designers. Without a sense of the form of a design, its expression, its nature as an artifact itself, and its documentation, designers who wish to escape the landscape of sameness and traditional forms are hindered; they have no image of how to express designs, how to move design knowledge forward and what to move toward.

In the sections that follow, the questions of how we design and what is created are given particular attention. There is no easy answer to these questions. Instead, the answers evolve in and are limited by the mind of the individual instructor. As the design insight of the instructor matures, the instructor slowly, by stages, moves toward a studio to accomplish the task of training designers.

A Note on Varieties of Studio Instruction

A studio can be described both as a place and as a form of instruction. In the sections that follow studio, the place, is of less importance than studio, the technique. It is my conviction that adopting the studio technique will over time lead the instructor to request a venue suitable for exercising it, but the form of that will depend on the specific characteristics of the technique. If an instructor is evolving new insights into design and the teaching of design, the form and furnishing of the studio will evolve correspondingly.

Evolution of An Instructor Toward A Studio Technique

My experience training ISD teams and managing their projects in industry only partly prepared me for instructing in the university. One of the big differences I found was that when you tell university students what to do and how to do it, they ask, "Why?" and expect there will be a good answer. In 2003 I took an academic position at Utah State University. There I was assigned immediately to teach basic instructional design courses to Masters and Ph.D. level graduate students. I also taught courses in Implementation (of instructional products) and Instructional Simulation.

My industry experience proved useful, but it didn't fully prepare me to answer the "Why?" question. One of my first realizations was that I had never really asked myself the question enough, and it was then that I began to seek better explanations for why things were the way they were. What I discovered over a period of many years was that the ISD process does not explain *how* you make a design. It describes data-generating processes that may contribute to a design, it makes development processes manageable, and it defines development processes that lead away from the design processes, but it does not deal with questions about *what* is being designed or *how* to actually create a design. In virtually all ISD models there exists a box labeled "create the design" or something similar. This box is of greatest importance to the professional designer, but it is the least helpful as it is described in the ISD literature. The result is either design from prior examples, resulting in a lack of innovation, or invention of idiosyncratic design processes and invention of a new, suitable design model.

I have described how the nature of designed artifacts has changed over time as client expectations escalated and how it has become increasingly apparent that the traditional ISD process needs to be joined by other views. Simulations showed me the need for the design and development of dynamic content models that ISD did not anticipate. Moreover, with simulations there is no longer the familiar narrative presentation structure that so often supplies the designer with a familiar architecture (that leads to the *telling* of the subject matter).

A Different Design Approach

By the end of my Utah State experience I was gaining new insights into what might lie within the “now-create-the-design” box in ISD models. I had begun to see the need for emphasis on the architecture or functional nature of the thing being designed and on the architecture of the design itself. Between 1993 and 1998 Peter Fairweather and I co-authored a book on the design of computer-based instruction (Gibbons & Fairweather, 1998). It had a split personality that straddled the divide between traditional development processes and formulas and the demands of simulation design. The first half of the book (up to Chapter 14) is very traditional; the second half (from Chapter 15 on) was about using the functional elements of the artifact as an approach the design. Three parts of the book define what have become “layers” in a book I published later in 2014 (Gibbons, 2014)—strategy, message, and display, or representation.

I began to use these new concepts in my teaching, especially in my simulation courses, and I found they provided a key for explaining not only the design of simulations and but of traditional didactic forms as well, which I consider to be “frozen” simulations. I began to see that the concept of layered design was already being used in a number of other design fields. Since my time at USU, the number of examples of this I have encountered has continued to grow (see, for example, Baldwin & Clark, 2000).

Layer thinking does not eliminate the need for a systematic process for managing design projects and processes. What it adds is much-needed detail about design that is not supplied by systematic design models during the key creative moments that actually populate the design with theoretically- and pragmatically-motivated substance.

The Impact of Layering on My Teaching of Basic Design

The impact of the functional-layer approach led to important changes in my teaching methods and eventually resulted in my increasing commitment to studio methods.

At USU I had been using lectures and a term-long individual development projects, which students chose for themselves. Assignments for each of the ISD processes were due at points scheduled throughout the term, and they were checked during the term at key progress points according to quality criteria I provided in a course manual. Each assignment submitted by each student was checked, given feedback, and recycled (in some cases multiple times) as required until I judged that a basic criterion had been satisfied. This system worked because of the explicit ID model it was based on.

The downside of this approach was that the products the students were designing were mechanical and unimaginative. Only rarely did a student design anything other than a didactic tutorial that relied heavily on the presentation of information. Moreover, students that I challenged to try to design something different and innovative were unable to see how applying the systematic process facilitated the creation of the design. When I faced the same students in the instructional simulation course, they were at a loss as to how to proceed until mid-term.

I realized that the problem was that I was not teaching students how to design by thinking like a designer; I was teaching them to perform the stages of a process mechanically and efficiently. When they practiced their skills in the real world, their creative range as a designer would therefore be restricted to traditional instructional forms, and if they designed more non-traditional forms, such as museum displays, simulations, or learning environments, they would find themselves uncertain how to proceed, just like the simulation class students.

Classes using the ID model system at Utah State were held in a well-equipped multi-media classroom with students seated at tables facing the front of the room. Instruction included lectures, demonstrations, and dissection of examples. Examples of student work were used (by agreement) during these (friendly) critiques.

I used this pattern of instruction until I moved to BYU, each semester spending more and more time explaining to students the layered approach that was becoming increasingly clear in my own mind. At this time the concept of model-centered instruction (Gibbons, 2001) was also gaining traction in my thinking and with students as a conceptual description of the core simulation mechanism.

Over the Watershed: Commitment to the New Approach

Shortly after I arrived at BYU, I was predictably assigned to teach the basic instructional design course and, soon after, the advanced design course. I became committed to using the functional-layer approach, which was becoming defined in sufficient detail to be practically useful. The dilemma this raised was that I now had two approaches to design that were not mutually exclusive and that I wanted to crowd into the space of a single semester. I couldn't send students into the working world without an understanding of ISD terminology and processes, but I also wanted to give them a conceptual design edge for the problems they would meet that didn't fit the traditional mold.

The classroom at BYU was a standard multi-media classroom with 35 of the most rigid, uncomfortable, and hard half-desk student chairs ever manufactured—arranged in straight rows. This was a step backward. Sticky feet on the bottom of the chairs made them hard to rearrange, and the classroom space was so full of chairs that any rearrangement required piling chairs on other chairs. This was not a friendly place for teaching the kind of ideas that would in the future require a much more open, flexibly configured space. Moreover, the room configuration did not lend itself to team design, which I decided would have to be an important element of the advanced design course curriculum. It was at this point that new subject matter, a new teaching technique, and a terrible teaching space collided to send me to the Dean's office with a campaign for the creation of a design studio. This idea was also championed By Peter Rich and Rick West, new colleagues who had joined the BYU faculty and added their weight to the project.

Even before the studio was approved (which took a matter of years), I decided to split the semester evenly, reduce the number of ISD processes taught, and introduce experiences with layer design into the last half of the semester. The order was ISD first, layers last.

This turned out to be the wrong order. What I discovered was that teaching ISD gave the students a concrete way to intellectualize designs. When the more abstract idea of layers was taught in second position, it confused students who had already adopted a process frame of mind. It stifled creative approaches before they could develop in students.

Accordingly, in the next basic design course, I introduced the layer approach first, using multiple, rapid design challenges one to two weeks long at most, followed by a studio critique of the products, deriving principles opportunistically. What students discovered was that they already knew a good deal about design intuitively. The rapid-fire projects and the lack of process structure showed them this. It also made it possible during the second half of the course—the systematic process portion—to refer back to the creative issues of design they had experienced at the beginning.

At the beginning of the course, even before any terminology had been introduced, critiques were focused on close observation of the examples, noticing details, and intuitively judging what worked and what didn't. Only during analytic discussions of examples did we try to give things names. Deficiencies in student work (judged by the class) usually hinged on missing design decisions within different layers. This led to discussions of the layers and the decisions characteristic of each layer. This led naturally to a discussion of the multitude of design decisions everyday designers make without realizing it. This led them inside the mystery box.

In my own thinking the question surfaced: "What makes it a studio?" Accounts of studio innovation were appearing more frequently, including the account of Georgia's curriculum reform experiment (Clinton & Rieber, 2010). What did make a studio? The place? The method? The role of the learner? Clearly, my own shift in thinking was not due to a change in physical space but to a change in the subject matter, teaching style, and a new conceptual approach to design.

Following the layer portion of the basic design course in the first half of the semester, many students found the ISD portion of the course a welcome change because it was more concrete and made them feel more secure. But by the time they encountered the process model they were used to thinking creatively. As expected, the designs they created in the ISD portion of the course became more creative and divergent than they had been in the ISD-only course or in the ISD-then-layer course. Students were more confident in attacking the ISD problems. This order of teaching became my preferred pattern.

The Advanced Design Course: A Studio Becomes Real

After two years, I began to teach the advanced design course as well. Some essential areas were not being addressed in the basic design course:

- Acquiring more mature design judgment
- Engaging in innovative design thinking within a team structure
- Acquiring design confidence in non-traditional projects
- Appreciating design as a process of discovery
- Learning to sequence decision making strategically
- Learning how to approach the design of non-traditional instructional forms

The uncomfortable chairs were by now banished from the classroom and replaced by reconfigurable tables and (somewhat) more flexible and comfortable chairs. Whiteboards appeared on all of the classroom walls. This was when new colleagues Rick West and Peter Rich, who both had experience in the University of Georgia studio system, introduced to our faculty, and to the Dean again, the idea of a separate, protected design studio space reserved just for our department and just for design courses. Rick and Peter designed a configurable workspace, private storage areas, and a variety of media appliances for sharing design representations. Over the next four years this goal was realized, thanks to their efforts. One of the things that became clear at this point was that a public, viewable representation of an evolving design was paramount. The new studio design addressed this problem by becoming a flexible representation space.

It was clear that in order to address the course curriculum goals I had set the advanced course had to be team-centered and that the design problem had to be high-stakes, real-world, visible, and challenging. I felt there had to be a chance that the class-team could succeed (or fail) in a visible way, but if they succeeded (and I made sure they would) there would be plenty of medals to hand out and considerable new confidence generated.

From the beginning, we had a string of fascinating projects that required the student teams to move outside their traditional stereotypes of “instruction”. This brought us face-to-face with the issue, “What is designed?”:

- A magazine wanted us to recommend new article formats that would encourage parents and children engage in activities together.

- A cultural history museum wanted portable cultural experiences for public school classrooms.
- A second history museum wanted a way to connect children of the current era with the experiences of children of other historical periods.
- A client wanted a large space designed to house and give a coherent theme to a number of interactive “science of light” displays (Ashton et al, 2011).
- A client wanted to create a culture among its high-level employees that would unite successful but disparate elements of its organization.
- A client wanted a design for the “e-book of the future”, including a sustainable business plan for its marketing.
- A client with a multi-venue family park wanted one of its venues redesigned using out-of-the-box ideas, but with a particular type of family learning experience in mind Nyland, Langton & Gibbons, 2015).

These projects underscored the idea that the traditional definition of “instruction” was changing and that instructional designers are experience designers of both formal and informal learning environments.

The instructional challenge for an advanced course using a real project is that it can’t be staged like a basic course. The sequence of design conversations that a real design problem presents can’t be scheduled beforehand. They often occur in response to momentary needs and prior decisions.

The instructional approach I chose for the advanced design course was to keep both the layer and ISD design approaches in the background and let expediency reveal moments when one or the other could help if it were pulled into the foreground. The most pressing expediencies in a real-world situation are the nature of the problem, deadlines, client relations, team organization, resources, team skills, and the design environment. The most critical aspects of the design environment directly related to progress on the design itself are team communication, team leadership, and the public representations of evolving design decisions. Project management tools are important but secondary, because new problems bubble to the surface in an unpredictable order. If the schedule becomes too much the center of attention, the design process begins to drive the project, and creativity takes a back seat.

The Future

The studio as a method and as a place will continue to grow within our department. Our department’s main studio proponents (Rich and West) have continued to pioneer studio instruction and have reached out across campus, forming relationships with design instructors in several design-oriented schools and colleges. Recent developments from their sustained efforts include: (1) the design and teaching of multi-department, multi-disciplinary design courses, (2) the launching of projects by interdisciplinary design teams, and (3) a project underway to create a dedicated design space in the library as a high-tech interdisciplinary campus design studio.

Conclusion

The purpose of this chapter has been to give an account of the evolution of a classroom instructor into a studio instructor and an account of how as a result a suitable place for studio instruction became necessary. What was important was not the creation of the place but the instructional need for such a place.

In order for this need to occur, it would not be necessary for an instructor to undergo the kind of fundamental change in thinking that I experienced. A studio can be used to teach any form of narrative about design and how it occurs. Hopefully, our store of narratives will increase in the future, and hopefully the number of studios will increase. One might speculate whether the teaching of design to classroom K-12 teachers in a studio setting might be long overdue.

I would hope that this account of the maturation of a designer—one who felt secure in one particular approach to design—might be encouraging to other designers to see themselves and their design knowledge in dynamic rather than static terms. Our knowledge of design is expanding in a time period that is fast becoming a new Design Age. Perhaps others will find an evolution in their own thinking taking them down a different path—one that will not only illuminate design for others, but one that carry them toward the studio as a place for instruction in designing.

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