

**Lessons Learned From the Real World:**  
**Reflections On A Journey**

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**Abstract:**

*This paper will discuss the authors' reflections on an instructional design in the real world, and address underlying epistemological assumptions and relevant literature regarding ID processes and models.*

**Introduction:**

In a recent issue of *Educational Technology*, Caleb Clark reflects on his “Journey of a Flower Child Into the Land of Educational Technology Consulting”. In the end, he is a clean-shaven, suit-wearing consultant who, under the guidance of the formidable Allison Rossett, finally “gets” what the field is about and impresses his client with brilliant insights and ideas. I have yet to wear a suit to work, I doubt I have ever wowed anyone with brilliant insights about anything (let alone educational technology), but I too am reflecting on lessons learned through my journey.

In the largest sense, my journey within the field is both my work and my study. Several past projects on which I worked were, in my opinion (as a typical Virgo whose pet peeve is disorder), a bit of a project management nightmare. This initially motivated the development of a workable ID model, based on both “principles of ‘good’ ID” (read: “traditional”) and interactive media development processes. Through my journey, I have learned that a model is not the panacea for resolving many of the issues within our practice and within the field.

My objective was to attain a deeper understanding of practical issues in both systematic and constructivist instructional design processes to help inform, influence and improve my fieldwork. I gratefully acknowledge that in some ways this was a collaborative effort. My intent is to be as fair, respectful and yet as honest as possible. This journey was more about questions than answers. It was not an easy journey. There are no easy answers. It was not an easy paper to write.

This paper reflects on literature as it is relevant to my experiences, thoughts, and observations, and the lessons learned in the construction (and the implied deconstruction) of an ID model.

### **The Dichotomy Behind It All:**

Philosophers have debated the concepts of knowing and reality for centuries. Objectivists believe that reality is external and absolute, existing not within the bounds of the human mind, but on a greater plane. Therefore, reality in the objectivist sense is a greater reality shared by all humans through which our own personal experiences may differ. Objectivists view reality as irrefutable fact; its existence independent of the human mind beacons the knower to know the “facts” of this absolute reality.

Constructivists, on the other hand, share a Kantian belief that reality is not an external absolute but constructed by the Knower’s own mental activity. It argues that within their minds, humans construct their own versions of reality in an attempt to know and make sense of their world. Constructivist reality is one’s own interpretation of what exists, obtained through reasoning about one’s personal experiences, beliefs, and perspectives.

Jonassen (1991) writes of constructivism:

“...thinking is grounded in perception of physical and social experiences, which can only be comprehended by the mind. What the mind produces are mental models that explain to the knower what he or she had perceived... We all conceive of the external reality somewhat differently, based on our unique set of experiences around the world and our beliefs about them.” (p.10).

Constructivism views learning as a highly individual process, with knowledge grounded in the meaning we construct from personal experiences. Objectivist thought views learning and instruction quite differently.

## **Objectivist and Constructivist Instructional Design:**

Design, by definition, may be to form, invent or create a plan, work of art, structure, or system in order to provide solutions to a problem. Instructional Design essentially refers to the entire design and development process in creating an instructional or educational program. Dick & Carey (1996) note that "the term instructional design is used as an umbrella term that includes all phases of the ISD [Instructional Systems Design] process. The term design is included in the general name of the process and is also the name for one of the major sub-processes" (p.4). Though this double-use of terminology may be confusing, Dick & Carey note that this confusion tends to dissipate with ID experience.

The roots of instructional design are often traced to systems theory, and some may view the design as "a deterministic, equally rational and logical process" (Rowland, 1993, p.79). Schwier (1995) acknowledges that "although educational technology has traditionally been firmly rooted in objectivism" (p.199), most instructional designers feel that the circumstances of the particular learning situation or problem dictate the most appropriate design approach. Others bemoan the trend away from the "science of instruction", stating that "too much of the structure of educational technology is built upon the sand of relativism [constructivism], rather than the rock of science" (Merrill, 1996, p.2).

Constructivism has been called a "reaction to [this] pretension of tradition" (Schwier, 1999, personal communication). Others have noted that the last three decades saw a trend towards an acknowledgment of contextual reasoning and multiple perspectives rather than an objectivist reality (Tarnas 1991, in Wilson Teslow & Osman-Jouchoux). While there is variety in constructivist thought (for

example, Cobb's (1994) proposed division into socio-cultural constructivism and cognitive constructivism), this brief review will focus on the philosophy in general.

David Lebow notes that a cause of confusion regarding constructivism in an ISD context is that many theorists tend to view constructivism not as a learning philosophy but as a method, and conversely, ISD not as a method, but as a philosophy (Lebow, 1995, p.175). Constructivists do not build learning "systems", but rather, create learning "environments" in which knowledge and learning are contextually based and rooted in meaningful experience.

When post-modern ideologies influence the design team's mission, they cannot help but permeate design approaches and processes. Of course, ID is not "one size fits all", and more prescriptive approaches to design are appropriate in certain circumstances.

The following table illustrates a general comparison of constructivist and positivist [objectivist] instructional design.

## General Comparison of Constructivist & Positivist ID

<b>POSITIVIST ORIENTATION</b>	<b>CONSTRUCTIVIST ORIENTATION</b>
Roots in cognitivist information processing and behaviorist theories: Gagne, Bloom, Skinner	Influences include Piaget; Bruner and Vygotsky; philosophies of Kant and Dewey
Systematic procedures leading to learning outcomes	A philosophy – avoids step-by-step recipes, “one size fits all” or “cookie cutter” approaches
Focus on building instructional systems	Focus on creating or fostering learning educational environments rich in embedded knowledge
Goal: efficient and effective transfer of knowledge; focus largely on declarative (factual, or “what”) and procedural (“how to”) knowledge	Goal: emphasizes experience and reflection: constructing, reasoning and analyzing meaning
Focus on simplification (start with easy and progress to more difficult) and repetition (rote learning / drill and practice)	Real world experience, authentic activity, situated learning Examples: “micro-world” and multimedia simulations; construction kits (Perkins, 1991); social interaction
Linear/hierarchical approach to learning	Holistic approach to learning
Concrete and defined instructional goals, objectives & strategies for all learners	Learner negotiates objectives; objectives may emerge depending on learner and context. Multiple goals, objectives, strategies
Assessment and evaluation integral part of program design – learning is observable and measurable	Traditional assessment difficult – learning is context-dependent
Teach cognitive strategies for assisting in storage, transfer and retrieval of information – cueing, chunking, etc.	Enable learner to reflect on experiences and information to “internalize” into meaningful knowledge
Focus on skills, sub-skills, and attaining specific objectives	Focuses on “general domain of knowledge”
Separation of content and delivery/media (model exists independent of content)	Content and delivery/media are linked – generally do not exist independent of each other
Instructor-controlled instruction	Learner-centered instruction

David Merrill (1991) notes that while Instructional Systems Design (ISD) has well-documented methodical steps for designing and producing instructional systems, constructivist designers do not have a standard design process. He states that a cursory examination of the task analysis phases of ISD and constructivist ID yields little difference in the actual process and methodology, except that perhaps constructivism would be less systematic in its approach.

The very nature of constructivism does not easily lend itself to “simple recipes and cookie-cutter formula” models of instructional design (Wilson, Teslow & Osman-Jouchoux, 1995). Constructivism is context-dependent, and is a philosophy or “way of thinking about design” rather than a method or approach. Therefore, traditional instructional design models and strategies could be adaptable to constructivist design. However, this “still add[s] up to something of an [instructional design] cop-out. Theory that doesn’t connect to practice will not result in better designed instruction” (Wilson, Teslow & Osman-Jouchoux, 1995, p.110). Jonassen & Rohrer-Murphy (1999) reiterate that since these epistemic beliefs are fundamentally different, traditional approaches to design are inappropriate for constructivist learning environments (CLE's).

Dick & Carey (1996) suggest that their systematic approach to Instructional Design is similar to following a recipe in a cookbook - "you do this and then you do that" (p.5). To have a little fun with this analogy, let's see what might happen if instructional design was like baking a cake. (Disclaimer: no disrespect whatsoever is intended in the following analogies).

## **Baking with Walter Dick & Lou Carey\***

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If Lou and Walter were baking a cake for guests, it might look something like this:

1. **Determine your goal.** What do we want to achieve by baking a cake?
2. **Analyze that goal.** What's involved in baking it? What ingredients are needed?
3. **Analyze cake-eaters' tastes.** Will guests like this kind of cake? Do they even like cake?
4. **Baking objectives.** Decide how we want the cake to look, smell, and taste.
5. **Assessment instruments.** Our criteria for deciding whether the cake achieves its goals.
6. **Develop baking strategy.** How are we going to bake that cake?
7. **Development.** Do it! Mix ingredients, pour into pan, and bake the cake.
8. **Formative taste-test.** Taste-test to decide if we think the cake met our objectives.
9. **Revisions.** If not, throw it out, revisit baking objectives or strategy and bake another.
10. **Summative taste-test.** Serve the cake to guests. Evaluate cake based on their reaction.

Whether Walter & Lou are making a chocolate, cherry or lemon cake, they methodically follow the same basic steps. The product or outcome differs mainly because of the different ingredients. Hopefully Walter and Lou enjoy spending time in the kitchen, because their approach takes a while.

\*Based on Dick & Carey's (1996) *The Systematic Design of Instruction*.

## **Constructivism in the Kitchen\***

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On the other hand, if Constructivists were in the kitchen, it could look a whole lot different. Their philosophy is that every cake-eater has different tastes and whether the cake tastes good depends on one's preferences.

They may say that chocolate, cherry or lemon cakes are too different to follow a generic recipe, as the cake itself is inextricably linked to their eaters' personal tastes. The constructivists might have a whole baking team, which includes end-eaters. The constructivist cake, made right may be extremely delicious, but their approach could be hit-and-miss or chaotic if not approached with care and diligence. Their process could look something like:

1. **Decide to enter the realm of baking and analyze that eaters want a tasty cake.**
2. **Set up the kitchen with a variety of utensils, ingredients, etc. Get the team together.**
3. **Make and bake a cupcake prototype following some general baking guidelines.**
4. **Taste-test the cupcake.** Have the eaters taste the cupcake to see what they think.
5. **Evaluate.** Do the eaters like it? How does the recipe need to be changed?
6. **Return to analysis and prototype until it tastes good.**

\*Pilfering the ideas of Wilson, Teslow, & Osman-Jouchoux, 1995.

\*\*Authors' note: This is how I actually bake. You might perish from hunger waiting for Walter and Lou, but that is likely preferable to eating my cupcakes. Inside joke. Just ask.

## **Instructional Design Models and Processes:**

The general five steps for instructional design are *analysis*, *design*, *development*, *implementation*, and *evaluation*. Some models focus less on some steps and more on others (for example, Dick & Carey's (1996) model gives only a cursory examination of analysis, though directs the designer to relevant literature, such as Rossett's *Training Needs Analysis*).

Throughout the last four decades, an abundance of instructional design models have been created, documented, and presumably utilized (Andrews & Goodson, 1980; Bagdonis & Salisbury, 1994). Andrews & Goodson define a model as "...an abstraction and simplification of a defined referent system or process, presumably having some noticeable fidelity to the referent system or process..." (1980, p.163). Models often assist us in visualizing an abstraction, or something that may not be viewed directly (Bagdonis & Salisbury, 1994). In the simplest sense, models are representations that help to guide us through the process of effective design of instruction. They provide common reference points, milestones and lexicon so that we may better understand the concept of "Instructional Design" and its process. The terms "theory" and "model" are not synonymous, though theory may be incorporated into a model. Theories are the underlying assumptions, ideas and propositions of the belief (i.e. how people learn), while a model is the visual representation of understanding those beliefs (i.e. how to design effective instruction according to a theory of how people learn).

Theoretical underpinnings of instructional models, concepts and strategies must be understood by the developer(s) in order to be meaningful and effective (Andrews & Goodson, 1980; Bednar, Cunningham, Duffy & Perry, 1995). Bednar, Cunningham, Duffy & Perry (1995) propose that:

Instructional design and development must be based on some theory of learning and/or cognition; effective design is only possible if the developer has reflexive awareness of the theoretical basis underlying the design. (p.101)

Many consider the 'traditional' design of instruction to be positivist or objectivist in orientation (Duffy & Jonassen, 1991; Cunningham, 1992; Driscoll, 1994).

However, positivist approaches are currently suffering a fall from grace. Industry "rags" as well as academic journals reflect this trend. Wilson (1997) notes that he does not actually know anyone who calls themselves "objectivist" (they instead prefer the term "realist").

The many models available to the instructional designer, particularly the novice, can be at times confusing and overwhelming (personal experience, c1999).

Significant differences may seem few and far between. Andrews & Goodson (1980) acknowledge that the proliferation of ID models may result from what they term the "not invented here" syndrome. They note that "Much effort seems to be duplicated because educators do not seek out existing models of instructional design or available materials before they endeavor to develop their own" (p.176). Molnar points out that "It has been said that if there were a Nobel Prize for educational research, we would nominate an entire generation of researchers for their co-discovery of the wheel" (in Andrews & Goodson, 1980, p.176).

### **The Journey Begins:**

That being said, it was not our intention as designers to add to the proliferation of ID models, or to re-invent the proverbial wheel. Rather, my intent was (is) to use research, theory and existing models to adopt or create a team-based

process framework (model) that could be effectively employed and adapted for multiple projects and design approaches.

Though instructional designers and media developers may share a collective vision and mission, this is often where the agreement stops cold. Both aspire to top-notch instructional design combined with creative visual and multimedia design. However, some discrepancy exists as to what “top-notch instructional design” is, or how to achieve it. This, I have found, is a political hot topic not only within the realm of academia or epistemology.

My (our) field mission is to design and develop interactive, effective and meaningful web-based learning experiences, conducive to individual learning styles, preferences and abilities. I believe the utilization of multimedia technologies is favorable to a mission of learner-centered design and individualized instruction. By nature, instructional multimedia may consider multiple learning styles (visual, textual, auditory, etc.). Veenema & Gardner (1996) note that multimedia (implying a variety of media) may enable students to form deeper understandings of concepts, though this cannot realistically happen "by simply adding more information and more media". Different types of multimedia benefit different types of learners and learning situations. Interactive instructional multimedia environments can be categorized into prescriptive, democratic, or cybernetic (Schwier, 1995; Schwier & Misanchuk, 1995), with each being appropriate for certain learning situations.

Some of my (our) projects have been primarily to redesign existing text-based content into a web-based multimedia delivery. This in itself elicits epistemic design issues. A model, I had hoped, would provide a more detailed and understandable “visual representation” of the phases and lexicon required to accomplish our goal of effective web-based learning environments and projects. In the past, a somewhat

“ad hoc” approach to team-based project design and development took over some projects (perhaps stemming from shared post-modern ideologies). It became yet another mission to set up a workable, manageable, yet creative team-based design and development framework, providing representation from initial marketing to the delivery phases. It so far is somewhat linear and systematic, borrowing and integrating multi-disciplinary literature, other models, and “practical theory” (if such a concept exists), as well as collective and individual field-based experiences. It is probably fair to say that it is a "standard" instructional design and development model or framework.

### **The Design & Development Process: Conflict and Collaboration**

Educational technology as a field is the result of an eclectic blend of psychology, communications, education, social sciences, systems theory, and management (Schiffman, 1995). Therefore, the field is open to stereotyping from individuals who primarily understand one or two of those aspects (Schiffman, 1995) rather than as a balanced whole. Some designers and developers (and therefore their processes) tend to favour some aspects of educational technology (e.g. media design, technology development) and minimize or ignore others (e.g. pedagogy, management).

Wilson, Teslow & Osman-Jouchoux (1995) state that:

“For an ID model to work in the real world, it must combine...two critical functions into a workable methodology: effective creative design on one hand and efficient management on the other...because of the tension between these competing functions, one will often predominate over the other. If the management function is emphasized, the project may come in under budget, but tend towards mediocrity in strategy and mundane learning outcomes. If creative design dominates, the project may be pathbreaking but remain forever in a state of partial completion.”

If positivism loves order, constructivism relishes chaos. In my opinion, chaotic creative design (though not necessarily always instructional design) dominated some projects. For a number of reasons, I eagerly sought some measure of balance between management and design, as well as between instructional design and creative multimedia design, in my fieldwork. (By "balance", I do not necessarily mean "equal", but the appropriate balance between the different elements.) Wilson, Teslow & Osman-Jouchoux (1995) note that implementation of effective management can make or break instructional design. Poor implementation results in confusion, disorder and chaos. Effectively implemented, a "team-based" or constructivist approach can improve the design by synergizing the chaos into a variety of perspectives and ideas. My experience has been that effective implementation and management of any process is difficult to achieve without some framework, plan, or model to guide it. I now believe that "systematic design" does not necessarily refer to only "positivist" or "traditional" approaches to ID.

The traditional design team is generally comprised of an instructional designer and an SME (subject matter expert), who may or may not obtain the services of media / visual designers later in the process (development). The constructivist design team includes clients, instructional designers, SME's, developers, and users (administrators, teachers, students, etc.) throughout the design process. At times I felt lost somewhere in between, with roles too ill defined or poorly managed to maximize effectiveness. Though content developers, programmers, multimedia designers, subject matter experts (SME's), and clients all contribute to design, sometimes "instructional design" seemed happenstance. It was as though some developers expected the actual "instructional design" to "emerge" from the media design and production, or some SME's thought ID involved basically

“developing good content” and then “creatively presenting and producing that content”. There appears to be a void between "principles of constructivist ID" and "synergizing everyone's ideas" into constructivist design. I do believe that when design feels "happenstance" or undisciplined, design teams may have crossed over to irresponsible design. However, this line appears arbitrarily.

Misanchuk, Schwier & Boling (2000) imply that in the design of instructional multimedia, instructional designers and multimedia /visual designers must work together as a team to be most effective. They state that principles of good ID (though not implying "good" equals "positivist" ID) must take precedence over visual or media design if there is a perceived or real conflict. The role of the instructional designer is ultimately to ensure that the product will be effective from an educational or instructional point of view, and the visual / multimedia designer to ensure creative, interesting, and intuitively aesthetic appeal. Without interdisciplinary teamwork, the result can be poor quality design:

“products that are overstuffed with bells and whistles that detract from learning, as can happen when the media designers get the upper hand, or products so dismal that it's hard to picture learners interacting with them [except] under duress, as can happen when instructional designers don't have access to media design support or won't listen to input from media designers” (Misanchuk, Schwier & Boling, 2000).

Some of my past had been marked by differences in instructional design, technical and visual/multimedia design “cultures” and ideologies. Due to imbalances in wills and numbers, the visual / multimedia forces at times prevailed. Visually talented and artistic persons tended to intuitively to measure the quality of instructional multimedia through its sensory appeal. Some seemed to feel that “quality” instructional design would be implicit in media design and production, as though the presentation quality itself defined that of the instructional design.

Misanchuk, Schwier & Boling suggest that these “culture” gaps cause difficulties within the development of instructional multimedia, due to “an over simplified view” and lack of understanding about the others’ culture. Ultimately, this often results in limiting all team members’ skills [and presumably, the quality of the end product]:

“These two groups, or cultures, [visual design and instructional design] tend to have different backgrounds and skills even though they are both focused on instruction and performance as a context for their work. In particular, specialists in development and production tend to come from backgrounds in which empirical evidence is defined as intuition developed through experience, whereas specialists in instructional design more often define empirical evidence as data derived from structured experimentation.”

Constructivism obviously does not lend itself well to empirical measures of quality design, as "values" are not always separate from "facts". Constructivists acknowledge that learning cannot necessarily always be measurable or demonstrable, which is somewhat problematic for the “scientists of instruction”. Those who primarily focus on the creative and intuitive aspect of design, the "artists of instruction", acknowledge the intangibility of quality but run the risk of crossing over into chaotic, undisciplined or irresponsible instructional design.

The theoretical basis of “good ID” remains a debatable topic in the academic world. Though unable to enjoy the luxury of ongoing theoretical debate, the real world is certainly affected by theoretical issues. For example, one view is that good instructional design presents content information through intuitive and interactive multimedia, enabling learners to enjoy the experience. Since learners perceive it as quality instructional material because they enjoy it, it is well-designed. A number of issues and implications arise from this view, such as how do we differ between “information design” and “instructional design”, “edu-tainment” and “educational multimedia”? How do we deal with desensitized learners when the novelty of

interactive multimedia no longer motivates them? Obviously there are no easy answers to a relatively simple question like “what is good ID”.

Appropriate balance between instructional design and visual / media design fundamentals is integral in well-designed multimedia products (Boling, 1997, in A. Satran). To be most effective, design team members must work together, and respect that each does what they do best. To achieve this balance, instructional designers must acknowledge intuition and creativity, as well as logic, theory, research and empirical evidence, in their ID repertoire. Conversely, those who highly value intuitive quality in visual and multimedia design must acknowledge the critical role that instructional design theory and methodology plays in both constructivist and positivist ID.

At the core of good post-modern instructional design is a unique balance between science and art. Acknowledging my field naivete, I believe that an exceptional instructional designer is like Leonardo Da Vinci. An artist at the same time a scientist (transcending both); logical and analytical yet creative and visionary, at ease with both empirical evidence and intuitive knowing; his skills and abilities attained and honed through learning, instinct and experience. (Elizabeth Boling (in A. Satran, 1997) notes that 'art' is a form of self-expression, and so in this context, creative 'design' may be a more appropriate term as it is problem-based and solutions-oriented.)

In studying and adapting the rather systematic phases of *analysis, design, development, implementation, and evaluation*, I found that most literature did not address what Misanchuk, Schwier & Boling (2000) call "the black box" of instructional design. We therefore took an interdisciplinary approach to filling in the blanks. They (Misanchuk, Schwier & Boling, 2000) advise that this "black box"

between visual / multimedia design and instructional design can start to be bridged by the “cross-fertilization of ideas”. As well, they suggest that design teams detail ID phases of development and production, and divide each into “definition of function” and “creation of form”. This was a useful and practical suggestion. However, as with anything, old habits sometimes die hard. We naturally tend to defend our own discipline when conflicts arise. (ID rules!)

### **Towards A Framework of Constructivist Instructional Design:**

Though literature is abundant regarding the philosophy of constructivism, very little “nuts and bolts” regarding constructivist ID exists. This may be why constructivist instructional design practice is so “fuzzy”. By its very nature, constructivism is not easily broken into specific steps. It is a highly individualized, holistic, and context-dependent concept. However, the gap between “theory” (“where the knowledge resides” and “practice (“where that knowledge gets applied”) (Wilson, Teslow, & Osman-Jouchoux, 1995) is of increasing importance to instructional design.

Some (such as Philip Duchastel, as cited in Myers, 1999) argue that instructional design in the future will become just one aspect under the broad banner of information design. Myers refutes the idea that information design and instructional design are similar concepts, claiming that instructional design has an ultimate responsibility to focus on learning strategies and pedagogical approaches which enable learners to acquire knowledge and skills. Information design focuses on the “clear and effective...organization, selection and presentation of information” (Myers, 1999). The relationship between constructivist ID and information design is concept that requires further exploration.

My experience leads me to believe that the team-based practice of constructivist ID does need some sort of framework to link theory to practice. A model provides a visual representation of an abstract concept, and constructivism is arguably an abstract concept as any. Without such a framework, the line between “irresponsible ID”, “information design”, and “constructivist ID” (Wilson, Teslow, & Osman-Jouchoux, 1995) may remain ill defined in practice.

Relatively little exists in terms of practical approaches or guidelines for constructivist ID. Wilson, Teslow, & Osman-Jouchoux (1995) do provide a “laundry list” of suggestions. Several of their general approaches include:

- Apply a “holistic” yet “systematic” design model. Throughout the process re-evaluate your design, and continuously return to the analysis (learners, content, context, task, etc.) to ensure you are on the right instructional track.
- Use fast-track or layers-of-need models to adapt ID methodology to fit the needs of the specific situation. A generic model is not always appropriate.
- Incorporate end users, learners and teachers into the design team.
- Model and test the feasibility of interfaces and products using rapid prototyping techniques early into and throughout the design.

Others provide guidelines for constructivist ID, such as Jonassen & Roher-Murphy's (1999) “Activity Framework” for the analysis of learners' needs, tasks and outcomes.

Some designers and developers hope that technology will provide a fix-it by automating instructional design, or creating rapid prototyping design tools. However, I do not believe that developing a tool in and of itself is enough. Technology will not provide answers. We must be much more aware of instructional design issues in our collaborative practice and fieldwork.

I also realize that I am not alone in struggling with such issues. In some respects, Educational Technology appears to be a field in crisis, and I hope that important issues are addressed. It is little wonder that there is such a widespread gap between practice and theory, if theory does not address practical issues. The academic field tends to admonish the practices of field-based entrepreneurs, who in turn feel some academics are too hung up on arguing theory to actually do any work.

**Some lessons learned (or at least my thoughts at this point in time):**

- *Instructional design can be a political hotbed not only in the academic arena.*
- *Acknowledge the epistemological and theoretical underpinnings in design approaches and processes.* Doing so will help avoid confused, ineffective or muddled design. If constructivism or post-modernism influences our project design, our processes and approaches must be compatible with these theoretical underpinnings.
- *"Good design" somehow bridges the gap between theory and practice.* The real world often seems to be worlds away from theoretical ID. Learning theory is the ultimate tie that binds. Effectively designed instructional multimedia recognizes that some theory of learning must be implicit in its design.
- *Instructional designers are both (or neither) artists and scientists in their approaches to educational and instructional solutions.*
- *Constructivist instructional design is not "anything goes".* "Ad hoc" ID under the broad guise of "constructivism" is not necessarily effective, well-designed or responsible instructional design. We must explore and articulate differences in practice between constructivist ID and "irresponsible" ID.

- ***The practice of constructivist instructional design is not necessarily the same as information design.*** The differences between the two can appear fuzzy or non-existent. Is information design masked as constructivist ID still just information design with a new name? I wonder whether it is sufficient to say it is instructional design only if the learner perceives it to be instruction. Is that "irresponsible" ID?
- ***Bridge the gap between “function” and “form”.*** Effective instructional design complemented by creative visual / multimedia design generally results in well-designed instructional multimedia. An inter-disciplinary team-based approach to design helps bridge this gap.
- ***Educational technologists, irregardless of their epistemic beliefs, have a responsibility to the field as well as to their project team, clients, and learners/users.*** Whatever we do, however we do it, we must ensure our work is a credit to the profession.
- ***Collaboration, done right, is a wonderful thing.*** Team-based approaches to design can be extremely effective when they are well managed, properly balanced, and have the right people for the right jobs.
- ***Appropriate balance of management with design.*** Without the guidance of some sort of framework or model, team-based constructivist ID is extremely difficult to manage. Chaos harnessed breeds synergy. Too much chaos results in a poor quality product just as certainly as poor design does.
- ***Pedagogy (learning) must ultimately be the master of technology.*** Educational technology without the education - whether constructivist or not - is still just technology.

**The road ahead:**

So far my journey into the field has been very exciting, challenging and frustrating. So many questions remain unanswered. Where and how do we draw the line between constructivist ID and “ad hoc” or “irresponsible” ID, or do we? Is there a distinction between instructional design and information design in this age of information worship? Will the widespread practice of confusing the two result in a lost art/science? Is instructional design even an art and a science, or neither? How do we manage and ensure effective constructivist design in practice? Could a constructivist design framework be developed and modified appropriately for each situation and context? What has caused this discrepancy between theory and practice, and why? Can it be resolved?

As I initially mentioned, this paper is more about questions than answers. It has opened the doors, eliciting further exploration and inviting the journey to continue.

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