

Tessmer and Wedman: Ahead of their Time

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Abstract: In 1990, Martin Tessmer and John Wedman introduced a new perspective to instructional design. Rather than a sequential waterfall approach, which dominated instructional design in the 1980's and 90's, the layers-of-necessity approach is a way of thinking about instructional design. Tessmer and Wedman viewed instructional designers as they truly are: designers who design instruction. They embraced the nature of design. Rolling back time almost 30 years, Tessmer and Wedman certainly were ahead of their time.

Keywords: instructional design, design thinking, layers-of-necessity

Introduction

Now pushing 30 years ago, Martin Tessmer and John Wedman introduced the layers-of-necessity model (Tessmer & Wedman, 1990). Visually disguised as a model, Tessmer and Wedman, modestly and maybe even a bit sheepishly, actually pronounced the layers-of-necessity as a new instructional design (ID) approach and perspective. In the model-dominant instructional design playing field of the 1990s, who could blame them for being a bit modest and sheepish in calling the layers-of-necessity a new perspective? Let's take a closer look at the layers-of-necessity. Tessmer and Wedman were ahead of their time.

Think back to the late 1980's and early 1990s. Most instruction was designed using sequential waterfall models. The output of one box in the model was the input to the next box in the model. Designing and developing instruction was a process: step-by-step, box-by-box. Tessmer and Wedman proposed a new perspective. The layers-of-necessity is not a process. The layers-of-necessity is a way of thinking about instructional design. It is this way of thinking about instructional design that places Tessmer and Wedman ahead of their time as they viewed instructional designers as they truly are: designers who design instruction.

In this article, I enthusiastically present how in 1990, with the publication of this work, Tessmer and Wedman were ahead of their time. I briefly overview the layers-of-necessity as a model and then explore Tessmer and Wedman's stance that the layers-of-necessity is a way of thinking about instructional design. My exploration focuses on what Tessmer and Wedman considered the critical differences between a layers-of-necessity approach and the traditional ID models. I do not labor in the details of the differences (see Tessmer and Wedman, 1990 for that discussion),

but rather I look at these differences in light of the nature of design that all designers such as graphic and web designers, engineers, and architects embrace, engage in, and enjoy. I conclude with reflections on what the layers-of-necessity means to me as a designer who designs instruction.

ID in the 80's and 90's

To provide some context, let's recollect what was going on with ID in the 1980's and 90's. Models continued to guide instructional designers as they embraced the increasing interest in the use of microcomputers for instructional initiatives (Reiser, 2001). In fact, Reiser noted that there were discussions to develop more ID models to assist with the interactive abilities of computer-based instruction. The 1980's saw the emergence of the relatively new performance technology movement, which emphasized front-end analysis, on-the-job performance, non-instructional interventions, and organizational results (Reiser, 2001). In the 90's, instructional designers witnessed an expansion of the types of activities that confronted them. Non-instructional solutions broadened the range of the ID field. Interests in constructivism, electronic performance support systems, rapid prototyping, and the internet to deliver distance instruction all impacted what was happening in an instructional designer's world.

Layers-of-Necessity at Work

This is the only section where I refer to the layers-of-necessity as a model. What makes the layers-of-necessity work? As a practitioner's model (Figure 1), the layers-of-necessity represents what instructional designers do on the job. It takes into consideration a breadth of designer expertise and practice, from simplified to highly complex ID approaches and everything else in between. An essential element of the layers-of-

necessity is the constraints facing the designer. Constraints can include time, duration, money, personnel, stress, difficulty, content and project familiarity, and material resources (Tessmer & Wedman, 1992). Each layer is self-contained and is, “matched to the necessities of the project,” (Tessmer & Wedman, 1990. p. 79). For ID situations with severe constraints, only layer 1 (See Figure 1) may be possible. For situations where more time and resources are available, a designer could choose to use a more sophisticated layer (layer 3 to ‘n’).

A Way of Thinking about Instructional Design

A critical difference between a layers-of-necessity approach and traditional ID models is that following a layers-of-necessity approach is a way of thinking about instructional design. Tessmer and Wedman provided compelling insight into how instructional designers think about design; no easy task. Even though people have been designing since the beginning of time, the ways in which people design has been poorly understood for a rather long time (Cross, 2011). It is designers and scholars like Nigel Cross who have cultivated the growing bodies of knowledge about the nature of designing and the essential aspects of design ability. Tessmer and Wedman viewed instructional designers as designers like their colleagues in architecture, engineering, graphic design, web design, and other design professions. To illustrate that the layers-of-necessity is a way of thinking about instructional design and that the nature of design is alive and well among instructional designers, I discuss how the layer-of-necessity characteristics of task enhancement, principle-based design, merged stages, opportunistic perspective, and efficiency-based design are embedded in the nature of design. Cross summarized what designers say about the nature of design:

There is a need to tolerate and work with uncertainty, to have the confidence to conjecture and to explore, to interact constructively with sketches and models, and to rely upon one’s “intuitive” powers of reflection in action. (p. 26)

Task Enhancement

In the layers-of-necessity approach, subsequent layers enhance the previous completed design work. Enhancement is not iteration where earlier design components are revised. Enhancement is adding onto the design work that was already done. Designers discover the layers of their project (Cross, 2011). A designer first sees things in his/her mind and then starts to sketch, organizing ideas. Design then becomes a journey where each external representation (e.g. a sketch, draft, prototype, or three-dimensional model) is another layer following on from the previous external representation as design ideas develop. Designers push along encouraging design paths, making progress. From time to time, designers pause, take stock of the design situation, and then keep enhancing the design process.

Principle-based Design

In a layered approach to thinking about instructional design, principles, not procedures, govern design and development activities (Tessmer & Wedman, 1990). A principle-based perspective contends that instructional design is based on layer-selection principles and layer-implementation principles. Layer-selection principles determine which instructional design activities are feasible given the design constraints while layer-implementation principles guide how the various design and development activities are implemented.

Designers design in uncertainty because design is dynamic and complex. Cross describes uncertainty as the joy and frustration that designers get from their design activity. A way to cope with uncertainty is to provide some order. Architects are known for imposing order by bringing a set of guiding principles that help provide starting points to the particularities of the site on which they have to build (Cross, 2011). The result is that the starting points or principles limit the problem to something manageable. With a narrower focus, the designer can work.

In studying urban designers, Levin (1966) witnessed designers jumping to partial solutions before

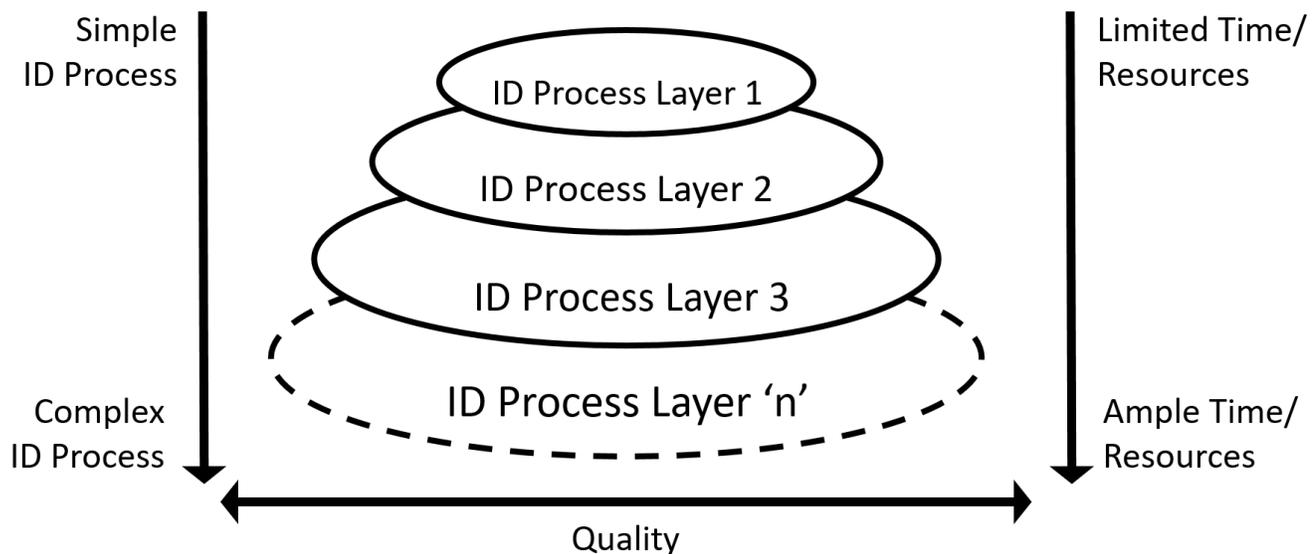


Figure 1. Layers of Necessity Model (Wedman & Tessmer, 1990)

they had fully formulated the problem. In order to formulate partial solutions, designers provide information or the “missing ingredient,” (Levin, 1968, p. 8). Levin called the missing ingredient an “ordering principle” which is the formal properties that are evident in a designer’s work (p. 8). Like a town designed from a rectangular grid. Like a teacup designed as a regular cylinder. Like an instructional design project designed from a situational assessment. Good designers are good at coping with uncertainty.

Merged Stages

Tessmer and Wedman contended that a layer is not distinguished by the type of instructional design task, but by the complexity of tasks in a layer. A layer is a merged set of specific tasks that enhance the design within the design constraints. Donald Schön’s (1983) reflection-in-action helps to explain what happens when an instructional designer is dealing with a layer. Schön presented reflection-in-action as a designer having a reflective conversation with a design situation. Because designers are faced with complex situations, a designer’s specific design moves can produce consequences other than those intended. When a designer makes a move, the designer takes into account the intended changes he/she has made in the situation by forming new understanding and making new moves. A designer takes stock in the new moves in a design situation, and the design situation talks back. In his observation of an architect student working with an architect tutor, Schön witnessed the tutor asking “what if” questions that were design moves that had implications on later moves. Each design move was local and contributed to the bigger design situation. Schön concluded that the designer listens to the design situation’s back-talk and then forms new appreciations which enhance further design moves.

Opportunistic Perspective

Ambiguity and constraints are necessary to the design process. Ambiguity allows all those involved in the design process the freedom to manoeuvre independently among the design objects (Cross, 2011). Constraints allow for reflection and taking stock in what has been done and what can be done. Tessmer and Wedman explained that instructional design is opportunistic. In a layered approach, design components may be deleted or minimized. Taking an opportunistic perspective, instructional designers identify what can be done with constraints. In my experience studying and observing designers, one thing is clear: designers want to know the constraints. When designers know the constraints they then can design.

No designer will settle for good or better when the can have the best. However, this is not how a problem usually comes about in actual design situations. “In the real world we usually do not have a choice between satisfactory and optimal solutions, for we only rarely have a method of finding the optimum.” (Simon, 1968, p. 64). It was Herbert Simon who introduced the term satisficing to describe such situations. Tessmer and Wedman claim that a layers-of-necessity approach is consistent with Simon’s satisficing. Instructional designers oftentimes have to select actions, “which get the job done while not necessarily in an optimal manner,” (Tessmer & Wedman, 1990, p. 79). “The layer is matched to the necessities of the project,” (Tessmer & Wedman, 1990, p. 79). Designing is not a search for an

optimum solution to a given problem. It is an exploratory process where a designer interprets a design initiative or brief as a starting point (Cross, 2011).

Efficiency-based Design

In discussing efficiency-based design versus effectiveness-based design, Tessmer and Wedman reiterated that a layers-of-necessity approach stresses that effective instructional design is determined by “what can be done not what ought to be done,” (1990, p. 81). For example, if an instructional designer had 20 hours and \$2000 to design an instructional product, what can a designer accomplish? Tessmer and Wedman explained that that a layered approach is time and resource sensitive. Constraints drive how instructional designers think about design.

Reflections on a Way to Think About Instructional Design

As a designer who designs instruction, I embrace a layers-of-necessity approach because it encourages intuitive design and provides me the freedom to do what I want to do – design instruction.

Designers rely on their intuition (Cross, 2011). When I design, I take an empathic design approach where I immediately put myself in my learners’ shoes. I want to know all about my learners’ hopes, dreams, and fears. I want to know what my learners want to accomplish. When I intimately appreciate my learners my design juices just bubble. I design a partial solution like a learning experience. I grasp a constraint like what delivery method I can use. I take stock in my partial solutions to see if I can shed more light on the real problem. I enhance the design process.

Since the layers-of-necessity is a way to think about design, I have the freedom to explore and discover something new. I have the freedom to design. The layer, not the sequential process, is important. What makes up one of my layers? It depends on the constraints. In some form or another, you will find components like context, outcomes, learning experiences, and an empathic design approach. Solid ID principles infuse each layer.

Martin Tessmer and John Wedman, thank you. You embraced the nature of design. You saw instructional designers as they really are: designers who embrace uncertainty and constraints, designers who confidently conjecture, designers who interact with partial solutions, and designers who continually take stock in what they have designed and add onto work that was previously done. In 1990, you, Martin and John, were ahead of your time. Today, your layers-of-necessity perspective is alive and well in this designer’s design approach.

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