

# **From Design *Theory* to Development *Practice*: Developing a Stronger Understanding of Our Field.**

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## **Abstract**

How does one develop deep knowledge of our field? Inherent in this quest is a complex field with multiple definitions and research perspectives on our practices. This session will showcase an approach that engages students in generative activities to prompt critical thinking about design and development theory and practices. Resulting instructional design theory databases collaboratively created by classmates and instructional development models with accompanying detailed work plans created by individuals will be showcased and discussed.

## **Introduction**

How does one develop deep knowledge of our field? Inherent in this quest is a complex field with multiple definitions and research perspectives on our practices. This paper showcases an approach that engages students in generative activities to prompt critical thinking about design and development theory and practices.

To become competent practitioners, those new to the instructional design and development (IDD) community must acquire advanced knowledge and skill competencies to develop and research new theories and continually enhance the state of our profession. Lave and Wenger (1991) suggest that newcomers are acculturated through processes beginning with legitimate peripheral participation, or participating on the side line through a process of observational learning and limited participation that eventually leads into in-depth engagement with our core practices. Through processes of production (e.g., training, feedback, involvement, leadership, etc.) newcomers eventually move into a role of full participation as they become recognized as members of a community.

In this paper we describe and showcase two activities and the resulting deliverables designed to engage IDD doctoral students in generative activities (Wittrock, 1990) to expand depth of knowledge of instructional design theory and development practices. As newcomers it is important that each individual be able to discern for him/herself what our field is about, how the community members have defined, practiced, and researched our field, and how each individual will in turn contribute to our profession. Instructional activities facilitating newcomers in building understanding and communicating new knowledge are important to growth in the community.

## **What is Instructional Design and Development?**

What should newcomers ‘know’ about IDD practices? Members of a community share definitions and ideals about how they will practice (Lave & Wenger, 1991). Practitioners have developed a multiple paradigms and approaches for designing, developing, implementing, and evaluating instruction, each based on different understandings of learning and instruction, and arguably, each having its advantages and challenges. This complexity of theories and practices can be challenging for newcomers. How ‘instructional design’ and ‘instructional development’ are defined impacts our actual practice. It is essential to characterize similarities and differences among the multitude of IDD paradigms and unpack the complexity of each to perform well within the community and help to enhance practices.

Reigeluth (1999) suggests that instructional design theories have four basic characteristics. Design theories (i) prescribe how instruction should be organized, (ii) include instructional methods and situations where their use is acceptable, (iii) have methods that can be broken down into more detail, and (iv) increase the probability that instructional outcomes will be achieved. Instructional design theories provide a framework from which instruction is organized and delivered to prompt learning.

Instructional development is often described as a systematic process for producing instruction. Gustafson and Branch (1997) have described several instructional development models accounting for a variety of perspectives. These models possess common steps yet have professed linear, iterative, or rapid prototyping approaches: (i) objective-based or open-ended in terms of outcomes; and (ii) specific adaptation for teacher, business practitioner, evaluators, or for specific delivery mediums such as classroom, self-study, computer-based, or distributed learning environments. Instructional development models thus provide a framework to identify, organize, produce, deliver, and evaluate instruction.

There exists contradictory usage of the terms instructional design and instructional development within the literature. Recently Gustafson’s and Branch’s (1997) work on development models was published under the title of “Instructional Development,” yet some of Branch’s earlier work describes the same ideas using the term “Instructional *Design* Models” (Edmonds, Branch, & Mukherjee, 1994). This contradictory usage of the terms can be challenging.

## **Educating Our Community Members To Advance Practices**

The complexity and discrepancies within the field form important foundations from which practices have emerged and the roots upon which our thinking about how our field should grow and change in the future. In this doctoral seminar, learners are prompted to think critically about, explore, and then describe the themes among our IDD practice literature. A generative and social learning perspective was chosen to engage learners in this thinking and working so that each member of the class contributed his or her own knowledge into a shared understanding.

Wittrock (1990) suggests that learning requires active participation of the mind. Comprehension occurs by formulating connections between perceived information, prior knowledge and other memory components. Learners build deeper knowledge by physically and mentally manipulating models and information while actively seeking to organize and integrate informational relationships between what is seen, heard, felt, read, and mentally processed. Further, engaging in activities collaboratively exposed learners to other member's interpretations to help each better understand the meaning of ideas and concepts within the varied IDD field.

## **Major Course Projects**

The two major activities accompanied by readings and discussions within the course include: social-generative class project and generative practice individual project.

### Social-Generative Class Project

Jonassen, Carr, and Yueh (1998) have described databases as mind tools that help breakdown information into smaller categories while allowing for interpretation of information. Learners in this seminar contribute to the creation of an online database of design theories. Learners define instructional design theories and create viable categories for comparison among the theories. Secondly, learners identify and read about multiple theories to decide if they 'fit' within the group's established definitions and if so, populate the data base with pertinent, agreed upon information.

### Generative Practice Project

Learners create their own development models and associated work plans. Each includes a visual representation, a brief description of how the model works, and a detailed work plan including a schedule of all tasks. The model is robust so that any type of instruction could be developed using this model.

Each deliverable is showcased with explanations of its formation, how the literature informs ideas, and strengths and weaknesses. The audience is prompted to provide critique, ask questions, share personal experiences, and contribute to the discussion. The following questions provide a beginning framework for the discussion:

1. How do we understand the similarities and differences between the terms instructional design and instructional development?
2. How does developing a database of instructional design theories help us develop depth of knowledge? What challenges did we encounter? How would we change the database now?
3. How does creating an instructional development model and accompanying work plan help us develop depth of knowledge? What challenges did we encounter? How would we change the activity now?

## **Reflection to the questions**

### Social-Generative Class Project: Building a Design Database

What is an instructional design theory? How is a design theory different than an instructional development model? What makes a theory an instructional design theory? These are the questions that the class started to try and describe.

Jonassen, Carr, and Yueh (1998) have described the benefits of constructing databases in learning and organizing information. In order for a learner to be able to construct a database, the learner has to be able to i) structure information about their topic, ii) identify and create appropriate and relevant fields, and iii) construct the database based on potential queries that would be helpful and relevant. In order to answer the main questions for this project, the five students in the class worked to work through these exact problems. i) What is the definition of an instructional design theory; how can an instructional design theory be identified? ii) What are the important and relevant fields that should be used in creating the database? iii) What are the potential queries that could be employed with this database and how should that drive the organization and development of the database? In addition to the design of the database, students had to identify and index a total of 50 instructional design theories in the database.

This process provided the ultimate experience for learning about the instructional design models. A working representation of the finished product can be seen at <http://web.cortland.edu/frieda/ID/IDdatabase.html>. While this represents the finished product in terms of completing the course, this by no means represents a finished product. The initial phases of the project were spent defining and describing design theories. Much of this work was based on the two volumes edited by Charles Reigeluth (1983, 1999). The students created a working definition of instructional design theories such that an instructional design theory: (i) is prescriptive, (ii) describes its acceptable uses, (iii) has detailed methods, and (iv) increases the probability that learning will occur (see also the more detailed definition above).

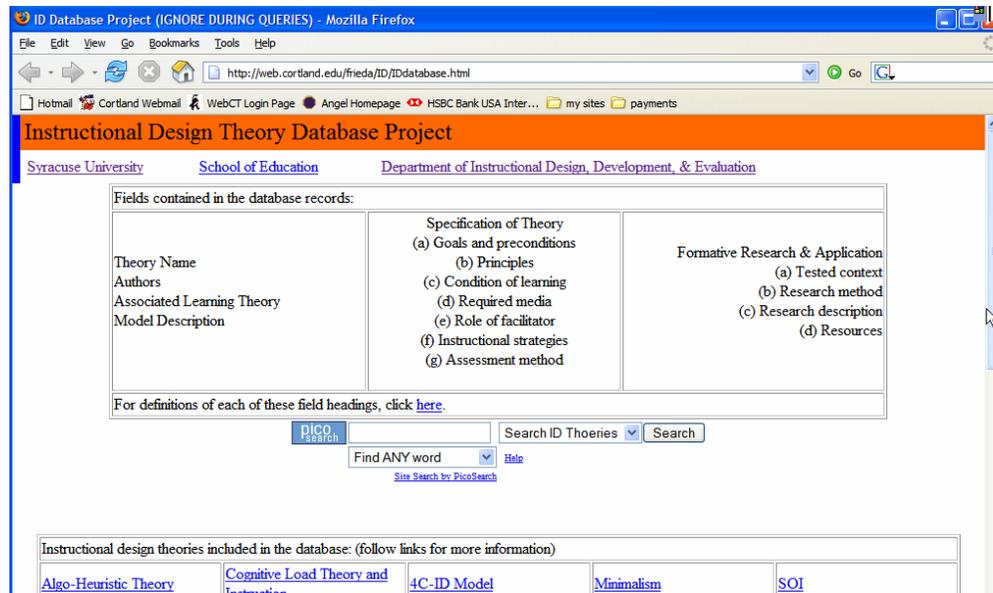


Figure 1 – A screen shot from the Instructional Design Database (<http://web.cortland.edu/frieda/ID/IDdatabase.html>).

During the process of reviewing the design theories and models, the students were able to define the fields for the database. The fields that were developed fit into three categories based on the working definition of instructional design theories: 1. theory basics (theory name, author name, associated learning theory, and model description), 2. theory specifics (goals or preconditions, principles, condition of learning, required media, role of facilitator, instructional strategies, assessment method), and 3. formative research and application (tested context, research method, research conditions, resources). This was a difficult process because the class had to define the outcomes (the fields) of their process before they were experts on the information. This work did, however, compel the students to grapple with the content at a much deeper level than if the fields already existed and the students just had to fill them in.

Perhaps the hardest part of the entire project was defining the potential queries of the database. This was the last step undertaken in the design of the database, which is perhaps evident upon trying to query the database. Because the potential queries were saved for last, there was a lack of uniformity in the records which made the database hard to search. Because of this, the nature of the finished product is less like a true database and more like an indexed web search. This, however, informed the students of how to better design the database in a next attempt.

### Generative Practice Project: Creating a Generic Development Model

In the beginning of the seminar course, Yongjin Lee started with a fuzzy question: what is constructivist instructional design and development? From literature review and discussion with colleagues, she acknowledged the influence of different epistemological perspectives (i.e, objectivism vs. constructivism) on the formation of instructional design theories. As the epistemological assumptions, constructivism and objectivism should be considered as two alternatives on learning and understanding (Cunningham, 1992;

Hwang, 1996). The two theoretical positions can be complementarily applied in instructional design practices (Hwang, 1996), but the epistemological perspectives can not be mixed in an instructional program (Bednar, Cunningham, Duffy, & Perry, 1995). Instructional designer may select a theoretical position to optimize the learning and instruction situation within each given setting and condition. Although the instructional design theories could provide generic and flexible prescriptions to any learning situation, making of instructional decision depends upon the instructional designer's analysis on the given situation. Instructional design practice is a form of situated activity depending on the specific, concrete, and unique circumstances of the project (Streibel, 1995). Based on the knowledge of instructional design theories, the instructional designer should be able to select instructional strategies to be called upon for the specific conditions of learning (Merrill, 1992).

The constructivist theories assume that our knowledge of the world arises through our construction and generation. Learners construct knowledge and subjectively process it in ways that reflect their needs, prior experiences, and attitudes. For the constructivist, learning is problem solving based on personal discovery and/or socially generated interpretation of experiences. Thus, constructivist instructional designers focus on the instructional methods and strategy that help learners actively explore topics, advanced their thinking, and develop their own interpretation of knowledge (Jonassen, 1999).

In regard with generating an instructional development model, Lee has developed a functional ID model based on constructivist approach. She conceptualized that Instructional Development (ID) model indicates systematic processes for developing and managing instructional methods, strategies, and media, in order to attain the instructional goal in the given setting. Her functional ID model is designed to articulate generic actions and strategies to develop constructivist learning environments in a variety of educational settings. The model consists of five focal points including Analysis, Design, Evaluation, Development, and Implementation. Each focal point is not regarded as a sequential stage of instructional design activities, but as an aspect of primary action and consideration which instructional designer must focus on to accomplish whole ID process. This non-linear ID approach stems from constructivist ID models (i.e., Crawford, 2004; Willis 1995), which emphasizes real-world focus upon the evolving process of analysis, design, development, and implementation, through formative evaluation and feedback from the end users or students.

For the last two decades, linearity of the Instructional System Design (ISD) models has been debated, as growing interest towards constructivism in ID field (Willis, 1995). Since the ID practice is a complex and dynamic system, the linear ISD approaches have limits to encompass the dynamic processes and changes. Lastly, constructivist instructional development models try to employ non-linear, flexible and authentic view of the ID process (Crawford, 2004; Willis, 1995). The recent constructivist ID models such as Willis' and Crawford's, however, mostly focus on conceptual modeling which intends to describe just taxonomies or components considered in the ID process. There seems a lack of explanation of practical and generic action plan and strategies of the ID process from the constructivist view. Within the magnified flexibility of the new constructivist ID

models, instructional designer should take a huge burden of selecting and elaborating each specific task and specifying action plans. The functional ID model focuses on specifying the recursive and interrelated procedures across five focal points as well as offering conceptual model of the ID process. The model intends to describe what and how instructional designer is doing in the ID process, through the explanation of primary concerns and the interrelationship of the concerns.

Four primary concerns include: problem, task, resource, and communication. The Analysis focus starts with *problem* in the given setting. The problem is related to a gap between the present status and the ideal future scenario of the instructional system. ID process is a sort of problem solving performance to resolve the deficiency in the given system. Instructional designer should identify problem symptoms in the system through inductive analysis of performances and environment analysis (Tessmer, 1990; Wilson, Jonassen, & Cole, 1993). Also, the problem is considered as the questions, the case, or the project that learners attempt to solve or resolve (Jonassen, 1999). This ID model assumes that instructional design must focus on active, constructive, and authentic learning with problem-based tasks across curriculum. Instructional designer must analyze the variety of expert users and their performance in order to select the problems driving learning. Inductive performance analysis such as critical incident analysis (Jonassen, 1987; Jonassen, Tessmer, & Hannum, 1999) can be considered at that point.

Within the Design phase, instructional designer should consider what and how *tasks* are accomplished. The instructional designer must identify the tasks that the variety of expert users do, rather than define isolated unit of content and type of learning with predetermined objectives (Bednar, Cunningham, Duffy, & Perry, 1992). The instructional designer identifies authentic tasks and provides instruction in the context of those tasks (i.e., Sticht & Hickey, 1988). Constructivist learning environment is designed to provide a rich context in which students are exposed to multiple perspectives and can learn to construct multiple perspectives on an issue (Bednar, Cunningham, Duffy, & Perry, 1992). To build such a learning environment, it is essential to design a variety of instructional strategies such as collaborating, coaching, simulating, evaluating, and scaffolding.



Figure 2 – A visual representation of the Constructivist Instructional Development Model (created by Y. Lee).

The development focus is closely related to how to manipulate and adopt relevant *resources* for developing a rich learning environment. Resources may include information, technology, and human, which are required to design and develop instructional materials and tasks that are appropriate for facilitating learners to construct their knowledge. Development team designs and develops instructional materials and tasks based on the selected resources, and makes revisions to them with ongoing formative evaluation. Even though this model depicts Design, Development, and Evaluation as separate focal points, the process of design, development, and evaluation mostly occurs at the same time. This is because formative evaluation and revision would occur from initial design and development phases, and reflection and adjustments in design and development would happen recursively.

In particular, the ID model places the Evaluation focus in the center core of the ID process because evaluation can occur and make changes at any stage of ID process. The ID model emphasizes formative evaluation which provides feedback the ID team can use to improve and enhance the instructional media and tasks. Revision is directly led based on formative evaluation feedbacks across the five focal points. Specifically, students and expert users frequently evaluate any components of the instructional materials at various stages, and give feedback which might be related to primary concerns such as problems, tasks, resources, and communication.

To develop and implement high quality of instructional products, *communication* among stakeholders is one of the most important concerns. ID team may develop instructor guides, self-paced tutorial, interactive computer-based training, participant workbooks, operations manuals, or job aids in order to inform the instructional materials

and tasks developed. Specifically, instructional designer should utilize efficient and multiple channels to inform the design and development of learning environments and to receive feedback from potential users and stakeholders. Besides, communication is a critical component for collaborative development process. Since the CID model encourages the collaborative development environment in which a variety of specialists related to ID and the end-users participate, selection of efficient communication strategies would be considered at every focal point of ID process.

In sum, the functional ID model consists of five focal points involving Analysis, Design, Evaluation, Development, and Implementation, which is a non-linear and recursive process with an emphasis on four concerns: problems, tasks, resources, and communication. Ongoing formative evaluation would review the primary concerns at any stage of ID process and drive the instructional designer to the next step and revision across five focal points. Particularly, the ID model emphasizes inductive analysis process of problems and tasks, and participation of the end-users throughout ID process. At the end of the course, Lee emphasized that this generative project of ID model allowed her to analyze and synthesize moderate principles provided by constructivist instructional design theories in order to develop practical heuristics and work plans for instructional development.

## **Conclusion**

The use of a hands-on and active process engaged the seminar students and compelled them to a deeper understanding of the course content. The differences between instructional design and development are not easily recognizable, especially with the confusion about the terminology used seemingly interchangeably in the literature. During this intensive and deep look at the content, by examining the literature of prominent members of our field, by working in depth through a database project, by creating and justifying an instructional development model, the students in the seminar gained a much deeper understanding of their field.

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