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Theory into Practice: A Bridge Too Far?

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This article proposes a research agenda that addresses the gap between theory and practice in the area of instructional theory. It reflects the beliefs of this writer and attempts to address current issues in the field of instructional technology. Citing the limited literature that currently exists, the purpose of this article is to bring to the forefront the need for research in the area of the application of instructional theories. Although many theories abound, this article mentions a few of the most prominent instructional theories in vogue today. Instructional theory is of crucial importance and should guide both research and practice. To present a thorough research agenda it is important to consider the following: (a) a glimpse of past research initiatives; (b) a systematic methodology that would guide research; and (c) questions that should be pursued to address the apparent gap between theory and practice.

This article proposes a research agenda that addresses the gap between theory and practice in the field of Instructional Technology (IT). The area selected is a subset of the field called the application of instructional theory. The purpose is to provide a framework for practitioners, researchers, and theorists. It is a rigorous and determined plan that encourages a coordinated and collaborative research effort to help bridge this gap.

To present a thorough research agenda, it is necessary to provide: (a) a definition of instructional theory; (b) a glimpse of past research initiatives; (c) an outline of the steps in the proposed research agenda; (d) a discussion of a systematic method for building a “bridge” that would fill the gap

between theory and practice; (e) questions that should be pursued as part of the research agenda; and (f) a recommendation for the most important next steps for developing new knowledge.

Instructional Theory—A Definition

An instructional theory is an integrated set of principles that offers explicit guidance on how to help people learn and develop (Reigeluth, 1999). For the most part, an instructional theory advocates the application of knowledge and skill as a necessary condition for effective learning (Merrill, 2002). For example, Perkins (1992) offered an instructional design theory, called “Theory One,” which could be used in project-based learning in multimedia design. “Theory One” as well as other instructional theories mentioned in this article, offer specific principles and guidance areas (Table 1). They offer four specific principles; (a) clear information; (b) thoughtful practice; (c) informative feedback; and (d) strong intrinsic or extrinsic motivation. In other examples, Reiser and Dempsey (2002) acknowledged that, Gagné’s Theory of Instruction is concerned with “instruction and how what is known about learning can be systematically related to the design of instruction” (p. 64) and Reigeluth’s (1999) Elaboration Theory was “developed to provide a holistic approach to sequencing that makes the learning process more meaningful and motivational to learners” (p. 427-428). Popper (1957) noted, “All theories are trials...tentative hypothesis, tried out to whether they work; and all experimental corroboration is simply the result of tests undertaken in a critical spirit, in an attempt to find out where our theories err” (p. 87). Instructional theories are created as a set of principles and guidelines. They are not rigid sets of rules that must be followed at all cost but are guidelines that help the practitioner judge the value of a theory.

Table 1
Instructional Guidance Areas for Project-Based Learning
Theory in Multimedia Design

Principle	Description
clear information	Descriptions, examples of goals, knowledge needed, and performances expected;
thoughtful practice	Opportunities for learners to engage in and actively demonstrate what is to be learned;
informative feedback	Clear and thoughtful guidance about processes and performance used throughout the development cycle;
strong intrinsic or extrinsic motivation	Activities that are interesting and rewarding to their expectation and goals (Reigeluth, 1999).

LITERATURE REVIEW

Attempts to develop IT in the past have floundered because of the difficulties inherent in applying basic research methods and techniques to solving practical problems (Clark, 1989). Duchastel's (1998) *Prolegomena to a Theory of Instructional Design* and Reigeluth's (1999) anthology of instructional design theories have addressed issues in the area of instructional theory as well.

Mclaughlin (2003) stated, instructional/educational theorists should be challenged to evaluate the consequences of their research. They should accept the challenge that surely confronts all researchers irrespective of the position, approach, or methodology they employ. Reigeluth (1999) stated that many theories presented in the field of IT have not yet been developed to a state of perfection...and believed that all could benefit from detailed guidance...applying methods to diverse situations. Reeves (1995) cited the "Lack of linkage to robust theory...and studies published which are empirical in intent...yield a dismal picture of the quality of contemporary research in our field" (p.6) He posited that much of the research in the field exhibited gaps in theory and practice.

Mitchell (2003), Grossen (1996), Saettler (1990), and Snellbecker (1983) acknowledged that educational research in instructional technology has

been filled with tension between the need to bridge theoretical research and practical application. Experts in this field have recognized and reported on this gap through publication, seminars, and conference presentations. Mitchell suggested that “Most published educational research has had little influence on teaching practice” (p. 2). Based on trends in research on teaching, learning, and educational technology (Hannafin, Hannafin, Hooper, Reiber, & Kini, 1996) presented categories that were likely to dominate educational technology in the 21st century (p. 396). From these categories, the area of expanded theory and research was mentioned as a leading topic in IT for the future.

Alutu (2006) used Gagne’s theory of conditions of learning to examine the guidance role of the instructor in the teaching and learning process. His paper recommended that “the teacher should not only have knowledge of the subject matter but should also guide and direct the learning process through application of appropriate learning theories. Hampton and Reiser (2004) examined Gagne’s theory of instruction and Reiser and Dick’s instructional model to determine how midterm student ratings feedback combined with consultation on instructional practices would affect teaching practices, rating of teaching effectiveness and student learning and motivation. Weber (1990) stated how theory into practice and the writing process could be valuable tools for effective instruction. His focus was on four principles of learning; teaching, monitoring, adjusting, and instituting instruction in the classroom.

Within the limited research cited in this article, it is evident that many experts expound on the value of instructional theory and theory into practice. What this author found lacking were empirical evidence and publication on findings that addressed the “gap.” Upon reviewing articles in the *Journal of Theory and Practice in Education Theory, Educational Philosophy and Theory, Educational Theory, Theory and Research in Education, Cognition and Instruction, Journal of Instructional Psychology, and Learning and Instruction* this author did not uncover an evidentiary bridge between theory and practice.

BUILDING THE BRIDGE

Grossen (1996) stated, “...those who provide teachers with theories...but no evidence that they are effective and no details on how to use them...are

really demanding that teachers do most of their work for them” (p. 12). The issue is not whether we engage in basic or applied research. The issue is the focus on evidence and results produced from instructional theories through the act of creative research. IT practitioners, researchers, and theorists need to articulate a theory and make explicit rationale on why it works. One possible element that would assist in building the bridge between theory and practice is Ellis and Fouts (1993) 4-Level Classification System.

The 4-Level Classification System

Acknowledging and building upon the work of Ellis and Fouts (1993) and Grossen (1996), a four-level category system has been recommended as a framework for conducting research in the area of applied instructional theory: (a) theory building, (b) hypothesis testing, (c) evidence, and (d) replication and verification (Table 2).

Level 1 begins with the creation of an instructional theory. This research agenda focuses on the application of instructional theory and recognizes both the value of prescriptive research and the acknowledgement that different methodologies should contribute to answering the question: Does the instructional theory in question lead to learning and new knowledge in application and practice? Level 2 uses the hypothesis from the theory in question to verify its appropriate review in qualitative and quantitative inquiry. From a practitioner’s view, the classroom would be the most appropriate venue to conduct inquiry. It is a step towards validity and usefulness and can be used to disprove a claim of effectiveness. Level 3 is the analysis of data and findings. Analysis of quantitative and qualitative data provides real-world results from the instructional theory in practical situations. Level 4 is the replication of the study. Replicating the study on a large scale determines the usefulness of the theory and if so, under what conditions.

Table 2
4-Level Classification System

Education	Method
Level 1. Theory Building	1. Develop a hypothesis
Level 2. Test the Theory	2. Test the hypothesis using a quantitative/ qualitative approach
Level 3. Analyze Evidence	3. Determine validity, rigor, and usefulness
Level 4. Replicate results in large-scale studies	4. Peer review, replication of research, large-scale and/or long-term follow-up studies

The Research Agenda

This proposed research agenda proposes critical areas that provide a process recommends a way to fill the gap between theory and practice.

1. Use the 4-Level classification system (see Table 2).
2. Adopt descriptive and prescriptive research methodologies that address specific areas for investigation relating to the application of instructional theories.
3. Produce a professional knowledge base that contains data from research findings allowing for integration and access to a full range of information permitting research initiatives to flourish (Gery, 1991).
4. Encourage collaborative efforts to promote as well as studies with schools, school districts, states, or organizations that support the application of instructional theories.
5. Develop an integrative research model (process) that can be used to assist in minimizing the development time for studies undertaken in this field.

The Most Important Knowledge Goals to Pursue

Research in instructional technology is a systematic investigation, involving the analysis of information (data), to answer a question or contribute to our knowledge about an educational theory or practice. As a systematic disciplined inquiry, educational research relies on methods and principles that will produce credible and verifiable results. (McMillan & Wergin, 2002)

The proposed research agenda addresses knowledge goals within the context of instructional theory. To define which knowledge goals are the most important to pursue, it is imperative that we understand the two primary considerations of instructional theory: (a) What to teach, which considers the knowledge components required for the selected type of instructional delivery and the description of how these components should be represented to facilitate instructional design; and (b) how to teach, which addresses learner engagement, interaction, and guidance to facilitate appropriate interaction with knowledge components. The knowledge goals from the application of instructional theories are founded in discovery in the cognitive domain. They are:

1. discover the kind of learning that occurs;
2. discover how factual knowledge is acquired; and
3. discover how procedural knowledge is acquired.

Two instructional theories that demonstrate knowledge goals worth pursuing are Merrill's Instructional Transaction Theory (ITT) and Reigeluth's Elaboration Theory (Reigeluth, 1999).

Methodology

Addressing the gap between theory and practice involves a systematic methodology. Whether a quantitative or qualitative approach is used or, whether the researcher engages in a mixed-method approach is not in question here. What is important is that researchers step-up and acknowledge the gap between theory and practice and engage in efforts to fill it.

A few questions that would ignite research in this area are: (a) Does the instructional theory contains a set of explicit assumptions or basic beliefs about the phenomena to be addressed? (b) Does it demonstrate key terms that have been explicitly defined? (c) Have specific propositions and principles have been identified? and (d) Have the underlying psychological dynamics of events related to learning been explained (Driscoll, 1995)?

After providing answers to these questions, the next step would be to determine which of these research approaches is best. Questions to consider would be: (a) Does it seem appropriate to conduct inquiry on the theory using a single-purpose approach or use a mixed-method approach that compliments strengths and non-overlapping weaknesses? (b) What questions might guide the inquiry and (c) What contributions to knowledge exist?

It is this author's opinion that the mixed method approach offers specific advantages. They are: (a) words, narratives add meaning to numbers. A descriptive method of inquiry provides an extension and deepening of theoretical propositions and understandings; (b) the researcher can test theory. The mixed method is appropriate for describing and quantifying the occurrences from a theory-in-use; (c) the mixed method provides evidence for conclusion through convergence and corroboration of findings. Evidence and findings are the result of interplay between quantitative and qualitative methods which could ground the results more emphatically; (d) the mixed method can be used to increase generalizability of results. Within the process of deductive/inductive analysis, the theory is examined in depth to determine if the propositions support the findings; (e) the selection of the mixed method can produce more complete knowledge necessary to inform theory and practice. The knowledge gained from this study could then be used to build the professional knowledge base.

Developing New Knowledge

There are two high-level priorities for developing new knowledge in the application of instructional theories. The first priority is a demonstrated willingness for collaborative efforts among experts in this field. Practitioners, researchers, and theorists need to come together to engage in viable, constructive research in the field of IT. Reigeluth (1999) suggested that

instructional theorists must elaborate their theories to greater levels of detail; component methods (parts, kinds, and criteria) and the conditions that guide the selection of alternative ways of operationalizing them.

The second priority is to develop a professional knowledge-base repository that could assist IT professionals. The knowledge-base would be a central repository for ideas, elements and objects that are crucial to the theorist as well as the researcher. It should form a link that connects instruction, research, and theory with allied disciplines.

For example, Reeves (1995) stated that, most of the research in instructional technology is conducted on the basis of assumption that education is governed by laws and therefore can be studied in a manner similar to other natural sciences such as chemistry and biology. IT researchers need to be more closely aligned with disciplines such as mathematics and science education, teacher preparation, psychology, computer science, and so forth. This linkage will provide a vehicle for IT researchers to understand and benefit from others research while also building IT theory, knowledge, and expertise (Hannafin et al., 1996).

Questions to be Considered towards Developing New Knowledge

In the application of instructional theories, basic research should focus on the following questions:

- What are the goals and preconditions of the instructional theory?
- What values are contained in the instructional theory?
- Are the methods employed effectively?
- What evidence is produced from the theory in its application?
- Can the theory be validated in its effectiveness toward developing knowledge?
- Does the theory improve learning, describe the position of the learner, and communicate the interplay between the teacher and the learner?

Methods That Seem Most Promising towards Developing Knowledge

Methods that are most promising towards the development of knowledge in the application of instructional theories comprise a synthesis of elements that should be united in this proposed research agenda. They are:

- Theory (interpretation)—order and insight to what is, or what can be observed;
- Knowledge goals—comprised of components that are used as evidence of theory in action;
- Methodology—the process of developing meaning and defining the research agenda;
- Substantive issues—instances deemed relevant to substantiate and validate a theory; and
- Research activity—the process by which hypotheses are developed and theories are validated.

To set this research agenda into action, the most important next step is a call-to-action from the IT community. This call-to-action consists of: (a) come to consensus concerning the best practice of promoting collaborative research efforts; and (b) develop and promote a professional knowledge base that will comprise an integrative object-oriented platform that can be expanded, and modified as it grows.

CONCLUSION

Snow and Swanson (1992) stated, "...Research seems to be fragmented and specialized, with programs focusing on different aptitude, learning and achievement constructs, levels of analysis, subject matter domains, student populations, and instructional methods; their results lead to different learning and instructional theories, and some of these seem incompatible" (p. 583).

This article proposes a research agenda that addresses the gap between theory and practice in the area of instructional theory. Citing the limited literature that currently exists, the purpose of this article is to bring to the forefront the need for research in the area of the application of instructional theories. Acknowledging and building upon the work of Ellis and Fouts (1993) and Grossen (1996), a four-level category system has been recommended as a framework for conducting research in the area of applied instructional theory. Priorities for generating knowledge from recommended instructional theories are cited as potential theories as starting points for research needed to fill the gap.

Another critical agenda item cited was the collaborative effort in this field. Practitioners, researchers, and theorists in the field of IT need to come together in a spirit of consensus to discuss ways in which learning can be made more effective across domains and cultures. Reigeluth (1999) stated, “a challenge for instructional theorists is how to provide sufficient guidance for successful use of the theory without constraining its flexible and creative application to unique situations.” Practitioners also bear some responsibility for the application and creation of an instructional theory. This research agenda also cites the need of a professional knowledge-base which would provide a mechanism for storing, developing, modifying, or reviewing the application of instructional theories.

Reigeluth (1999) stated, to facilitate learning, the development of an instructional theory that could stimulate constructive and collaborative dialogue as well as the potential integration of theories among IT experts and practitioners would be appropriate. Is it possible that an instructional theory currently exists that addresses these guidelines and has yet to be tested in a research venue?

Instructional theory is of crucial importance and should guide both research and practice. Until proven otherwise, an instructional theory is a trial, a tentative hypothesis and must be empirically tested to discover validity or areas of error.

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