Theory-Driven Research in Instructional/Learning Design and Technology Discipline (I/LDT)

Toward More Rigorous and Richer Inquiry

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In this paper, we argue that the Instructional/Learning Design and Technology Discipline (I/LDT) is a design discipline that belongs to the larger human tradition of design. Based on this premise, we recommend that I/LDT researchers: (a) Take advantage of the broader descriptive design theory and (b) rely on critical theory in order to provide context, explanation, and critique to the I/LDT discipline altogether. Drawing on specific examples from these theories, we provide specific recommendations for I/LDT researchers based on examples from precedent and high-quality I/LDT research.

The Instructional/Learning Design and Technology (I/LDT) discipline is primarily concerned with the subject of *design*—process and outcome (Goel, 1995, Smith & Boling, 2009; Tracey & Boling, 2014). When I/LDT researchers investigate technology integration (e.g., Clark, 1994; Kopcha et al., 2020; Kozma, 1994), study instructional behaviors/interventions and how they affect learning (e.g., Ertmer, 2005; Hmelo-Silver & Barrows, 2006), or focus on instructional/learning designers/technologists work (e.g., Gray et al., 2015; Ritzhaupt & Kumar, 2015; Rowland, 1992), the subject of design appears to be the unifying element in I/LDT inquiry, implicitly, or explicitly. In fact, it is reasonable to argue that I/LDT is a design discipline that belongs to the larger human tradition of design (Nelson & Stolterman, 2012).

Design is a human tradition—arguably the oldest human tradition—because it involves an aspect of an intentional creation (Nelson & Stolterman, 2012; Schön, 1983, 1987). Humans are engaged in design when they create “new things—tools, organizations, processes, symbols, and systems” (Nelson & Stolterman, 2012, p. 1). Designers, in this sense, are the individuals who have this ability for creation through coming up with an idea and bringing this idea into life; an idea by itself is not a design. Design is not an art nor a science but a distinct tradition by itself (Nelson & Stolterman, 2012). The science tradition, and therefore the scientist, focuses on the process; the primary emphasis is on the scientific method, not on its outcome. The art tradition, and therefore the artist, focuses on the outcome; the primary emphasis is on the artifact and not on how it was created. The design tradition, and therefore the designer, focuses on both process and outcome; the emphasis is equally placed on both the process of design and the outcome of such a process. In this regard, when a scientist places emphasis on the outcome and an artist places emphasis on the process, they have shifted from their original tradition to the design tradition. Of course, artists, scientists, and designers can move between these traditions in a conscious or unconscious manner to achieve their goals.

Furthermore, through listening to the formal or informal discourse of scholars, educators, and practitioners in I/LDT, it is evident that everyone is engaged in design activities for multiple purposes and through varying degrees of professional commitment. Scholars design studies to answer research questions. Faculty, trainers, and teachers design lessons/curricula to teach learners. Instructional/Learning Designers design diverse solutions that aim to improve human learning and performance in diverse contexts. Although we find it disagreeable to a great extent, some might argue that every member of the I/LDT community is an 'instructional/learning designer'.

Because the subject of design appears to be the unifying element in I/LDT inquiry, implicitly or explicitly, and because I/LDT is a design discipline, we recommend that I/LDT researchers (a) take advantage of the broader *descriptive* design theory, and (b) rely on critical theory to provide context, explanation, and critique to the I/LDT discipline altogether. Our recommendations are based on specific examples from these two diverse families of theories and on specific examples from precedent and high-quality I/LDT research.

Authors' Positionality

We, the authors, believe that it is important to disclose and share our positionality through a process known as bracketing before we put forward our intellectual recommendation. Creswell and Poth (2018) define bracketing as […] "a matter not of forgetting what has been experienced but of not letting past knowledge be engaged while determining experiences" (p. 77). Acknowledging our own values and biases is important to establish transparency and trustworthiness between us and you, the reader.

We both define ourselves professionally as learning designers, early-career scholars, and educators. We have the privilege and are fortunate to simultaneously practice design, conduct research on design, and educate future designers in diverse settings. This affords us a position and empowers us to focus our professional efforts toward creating a dialogue between the communities of design practitioners, educators, and researchers, in order to develop a beneficial exchange of ideas and recommendations. In this view, we think that each design community learns from the practice of the other. We strongly believe that design practice, research, and education should always be tied together to prevent gaps in knowledge that could be problematic to design practice and education. We have been hearing about the 'gap between research and practice' since our early days in undergraduate education. When we decided to study, research, and work in the I/LDT discipline, we focused our diligent efforts on this gap as we found it hugely problematic. This is what drives and motivates us.

Additionally, since we believe that design is the unifying element of I/LDT inquiry, we believe that we, as researchers, should be thoughtful of our research work as a design work that has an impact on the world. Thus, we should think of ourselves as the *guarantors of our design work* (Nelson & Stolterman, 2012), not the methods or processes we follow. In that regard, we think that theories, no matter how solid they are or where they are coming from, should be used in a "designerly" way (Lachheb & Boling, 2018; Stolterman et al., 2009). That is to say, we as researchers and designers place the theories at our service and do not let theories strictly dictate how to do our work in a limiting manner.

First Recommendation: Taking Advantage of Design Theory

Broad and descriptive design theories—developed outside of the I/LDT discipline—are grounded in situ design practice—situated in the original, natural, or existing place or position of design, not situated in what scholars think practice ought to be like. In turn, these theories offer rich and authentic explanations of what design is, how it occurs, and why elements in the design process/space fail and/or work well, depending on certain circumstances. Unlike well-established instructional/learning design theories (e.g., Keller, 1987; Merrill, 2002), design theories that describe design in situ, are sensitive to the unique aspects of contexts and do not *prescribe* design in a generalizable manner. We highlight two major design theories as examples (a) The Design Way theory by Nelson and Stolterman (2012) and (a) Schön's (1983) theory of reflective practice.

First Example: The Design Way Theory by Nelson and Stolterman (2012)

Nelson and Stolterman (2012) proposed a holistic design theory based on the following main arguments: (a) Design is a natural human activity: "Humans did not discover fire—they designed it" (p. 11)—what we think of traditionally as discoveries or inventions, are actually designs; (b) Design is a unique approach to life and different than other human approaches, such as science and art; (c) Design culture has important principles, such as creating an "ultimate particular" (i.e., real things based on what is ideal within the limits of the world), design is in service to others, and design is a way of inquiry since it requires various inputs and a grasp of the complex relationships in the environment; (d) Desiderata (desires) is what sparks design and makes it happen; (e) Designers employ 11 types of judgments to allow them to make design decisions; (f) Design exists in the absence of absolute certainty and perfect knowledge about the future; (g) The designer's character is the guarantor of the design, not the process or the model followed by the designer; and (h) Designers should consider their work of design in its own culture and build their design character with sets of knowledge, sets of tools, and sets of personal skills.

In elaborating on the idea of the guarantor of the design, Nelson and Stolterman (2012) discussed that the responsibility for the success and/or failure could not be placed elsewhere; it must be placed within the designer. The designer's character, judgment, and their abilities to design, separately and combined, can lead to a successful (splendor) design or a failed (evil) design. When design failure occurs, it is the responsibility of the designer:

Designers must accept responsibility for all they design. This accountability must be an integral part of their character. Designers should be relied on to fulfill obligations, not only to their clients, but also to a higher authority, one that is concerned for the sake of others and the environment in which we all live. (p. 211)

Nelson and Stolterman (2012) acknowledge that designers attempt to not assume responsibility for design failure. Designers can rely on "the logic of harsh, everyday reality as an argument for not assuming responsibility. 'I can only do so much!'" (p. 208). However, this argument is refutable as it allows fate to be the guarantor of design—it foregrounds the fact that designers play a significant part in our designed world. Additionally, Nelson and Stolterman (2012) argued that a comprehensive needs analysis—grounded in technical rationality—does not prevent design failure and leads to what is known as "analysis paralysis and value paralysis" (p. 32).

Placing the responsibility of success and/or failure of design outside of the designer and within the design process will lead to the assumption that there is a "right" process that can lead to the right design, irrespective of who the designer is. This view entails that a failure in the design is a result of a misuse of the right process and/or missing/overlooking a step in 'that right process.' In fact, the view of a 'right process' of design is strongly implied in the foundational I/LDT literature (Boling & Gray 2014; 2015; Smith, 2008), among design practitioners and educators, as evident in the ID CaseBook (Ertmer & Quinn, 2007; Ertmer et al., 2017; 2019), and in studies that seek to find best practices that every designer should do to prevent design failure. As Boling and Gray (2015) aptly remarked, the I/LDT discipline in general "view[s] the responsibility for appropriate design as residing outside the designer" (p. 111).

Second Example: Schön's (1983) Theory of Reflective Practice

Schön's (1983) theory of reflective practice describes designers' ways of thinking about their design work, how they make design decisions, and in turn, how they design through reflection-in-action and on-action. Such theory was a counterargument to "technical rationality"—a prevalent idea in the design methods movement that aimed to scientize design, advocated by Simon (1969) in his book *The Sciences of the Artificial*. Schön presented a conception of the design process as a *reflection-in-action*, such as design students in an architecture studio designing through active conversations about their design moves throughout the design process. Schön does not conceptualize reflection as a "time out" from practice but rather a continuous application of designers' tacit knowledge-in-action. This type of knowledge is not "knowledge in action" but "reflection-in-action"—new design "moves have to be tried out and assessed, and thus thought about and talked about" (Waks, 2001, p. 42).

One of the underlying processes of the design process as a reflection-in-action is the process of "rigor in on-the-spot experiment[ation]" (Schön, 1987, p. 68). In this process, Schön describes designers as engaged in experimenting with

different design solutions to respond to the framed design problem. Such an experimentation process allows designers to reframe the problem and/or test the adequacy of their hypotheses about the design problem at hand.

Similar to Nelson and Stolterman (2012), Schön (1987) discussed that the responsibility for the success and/or failure could not be placed elsewhere; it must be placed within the designer. Schön (1987) did not use the term 'failure' or 'guarantor of design' per se, but it does appear that the reflection-in-action process lends itself to the concept of design failure and designer's responsibility; designers experience mini design process-failures that play a generative role in their design process as a reflection-in-action. As Schön (1983) states:

The experimentation he [the male design student referred to earlier in the text] has conducted prior to the design review has made him aware of a conflict of appreciations. But he does not yet perceive it as a fundamental dilemma demanding for its resolution a significant change in one or both sets of values. In order for this to happen, he would have to carry out another sort of inquiry, one that would reveal both the intractability of his dilemma and an alternative approach to overall organization of the building. (p. 136)

How to Provide Context, Explanation, and Critique to I/LDT Using Design Theory?

The above two examples of descriptive design theories stress the importance of design context and how design work is situational. Thus, they call for situated explanations of design, and not making generalizable claims. Hence, they are design theories, not 'laws' that govern design. That is why these theories are 'drawn using a thick brush' and have been relied on by researchers investigating design topics in multiple disciplines, from business to education, to architecture and human-computer interaction (Beck & Chiapello, 2016). For that reason, these theories afforded scholars to provide context, explanation, and critiques in diverse design disciplines.

1. To Provide Context

For example, to provide context when studying teachers' teaching practices and/or teacher's perspectives/beliefs, we recommend that I/LDT researchers take advantage of Nelson and Stolterman's (2012) design theory to bring a rich description of teachers' design practice in diverse contexts. In this respect, I/LDT researchers will be able to make a convincing case of why teachers are in fact designers and be sensitive to their unique contexts. For example, precedent scholarship by Dr. Khendum Gyabak shows it is possible to appreciate teachers as designers, in their unique and diverse contexts, by taking advantage of Nelson and Stolterman's (2012) design theory. Such design theory supported Dr. Gyabak's (2018) inquiry work in a rigorous and ethical manner. As such, Dr. Gyabak (2018) was able to arrive at a rigorous understanding of teachers' thinking and actions carried out by primary school teachers in under-resourced schools. Although the studied teachers were found to not follow a formalized or systematic way of engaging in design, the study' findings suggest that studied teachers are engaged in design activities, such as planning, reflection, analysis, visualization, framing, schematizing, collaboration, and brainstorming, recollecting, predicting, theorizing, making, and tinkering. Through these findings and more, Dr. Gyabak's (2018) inquiry work offered several implications for teacher professional development, design theory, and non-governmental organizations (NGO) that work with teachers who are positioned in under-resourced classroom contexts around the world:

In the cases of these seven teachers, they are constantly making instrumental, appreciative, and compositional judgments (Nelson & Stolterman, 2012) in the planning process of their lesson plan to the point of delivering the lesson in class. Making do indicates the degree of innovative thinking applied by teachers to bring meaning and value in the learning experiences of their students. The cases offer insight into how primary school teachers are skillfully able to navigate around their constraints and manipulate the material world (Cross, 2010; Nelson & Stolterman, 2012). (Gyabak, 2018, p.105)

2. To Provide Explanation

For example, to provide an explanation when studying design pedagogy in I/LDT programs, we recommend that I/LDT researchers take advantage of Schön's (1983) theory of reflective practice to explain how design students think and what pedagogies they can develop on to support their students' design decisions. For example, precedent scholarship by Dr. Monica Tracey (2014) shows how the theory of reflective practice was crucial to understanding the thinking of design students and afforded Dr. Tracey to explain it in a rich way. As such, Tracey et al. (2014) found that graduate learning design students can respond to prompts on design concepts, experiences, and identity attributes. This ability demonstrates how designers-in-training can examine, integrate, and analyze their beliefs, knowledge, and experiences through the use of reflective writing assignments that support their development of a professional designer identity:

We believe that it is essential to develop designers as reflective practitioners in an effort to support their professional identity development and their ability to solve complex design problems. Our research findings indicate that reflective writing assignments are an avenue for supporting students as they explore their concepts, experiences, and beliefs related to design, which serve as the foundation for their emerging professional identities as instructional designers. Furthermore, reflection itself is a crucial task in the design space, one that allows designers to connect their personal design precedents with the unique issues and constraints of a particular design problem to develop an innovative solution. Thus, it is also the responsibility of ID programs to provide students with the opportunity to develop reflective skills; doing so in tandem with professional identity development is a natural pairing and can serve as an important component of ID curriculums. Tools such as the REFLECT tool can promote effective instructor and peer formative feedback, the design of meaningful reflection scaffold questions, and rigorous analysis of qualitative research on reflection (Tracey et al., 2014, p. 333).

3. To Provide Critique

For example, to provide a critique to I/LTD when studying 'all things related to instructional/learning designers in practice, we recommend that I/LDT researchers take advantage of Nelson and Stolterman (2012) design theory and other works from broader design theory (Bryan Lawson, Kees Dorst, Nigel Cross) to provide a substantive critique of I/LTD research. For example, precedent scholarships by Professor Elizabeth Boling and Indiana University Design Research Group (Boling et al., 2017; Gray et al., 2015; Lachheb & Boling, 2018; Smith & Boling, 2009) relied on multiple works from design theory to provide a substantive critique to I/LDT research that historically focused exclusively on design models, not on design professionals and their thinking/judgments. As such, Boling et al. (2017) were able to critique how design tools developed by scholars for instructional/learning designers are being underutilized or ignored altogether, because they fail to account for a crucial element—designers' own thinking and core beliefs:

It is surprising, therefore, to note the lack of scholarship in the field that addresses design judgment directly, rather than simply noting that it is a requirement for effective instructional design. One detailed theoretical treatment of how instructional designers exercise judgment (although this term is not used) is presented by Yanchar and Gabbitas (2011). They discuss the unexamined eclecticism (pragmatically using what works) or theoretical orthodoxy (using one single, rigidly applied method of designing) that many designers fall back on when the tools of the field fail them (Rowland, 1992). They argue that "eclectic" designers are actually using "conceptual design sense, [which] entails a designer's assumptions and values—often unarticulated and unexamined—about diverse aspects of the enterprise of instructional design" (p. 385) and recommend critical flexibility, a process whereby designers engage in critical reflection to explicate their underlying assumptions and values. Other studies have shown that instructional designers appear to refer to tacit philosophies in their design work (Rowland, 1992; Cox & Osguthorpe, 2003), but overall, efforts to describe these tacit philosophies have been minimal (Boling et al., 2017, p. 201).

Second Recommendation: Relying on Critical Theory

Our second recommendation is that I/LDT researchers rely on critical theory to provide context, explanation, and critique to the I/LDT discipline altogether. Critical theory is essentially a lens that emphasizes power differentials and

allows scholars to view power as “embodied in [human] cognition, speech, and action” (Habermas et al., 1984). Through a critical theory lens, scholars ought to foreground who has power over others, what is the power differentials between actors engaged in basic human competencies, such as speaking and understanding, judging, and acting (Bohman, 2003). Similarly, one of the main tenets of critical race theory (CRT) is challenging dominant ideology (Solórzano & Yosso, 2002) in order to value the voices, standpoints, phenomenology, and/or stories of marginalized groups of people. Critical theory and CRT are relevant to every inquiry work where humans are involved (Payne & Hamdi, 2009), and I/LDT inquiry is no exception.

In the I/LDT discipline, research provides implications for future scholarly work and, more importantly, for learning design/educational practice. Implications for practice usually include certain recommendations or considerations for designing learning experiences for a diverse group of learners. Yet, it is evident that each learner brings in their unique background and experiences into the learning space, hence the recognition of learners’ variability in instructional design models, such as Universal Design for Learning (UDL) (Lachheb et al., 2021).

1. To Provide Context and Critique

For example, to provide context and a critique when designing, implementing, and studying educational/learning interventions, we recommend that I/LDT researchers rely on critical theory and/or CRT to discuss power and positionality in/of their work. Such discussion can provide a multidimensional context of the study and provide a general critique to the I/LDT discipline that generally lacks thoughtful attention to the dimensions of diversity, equity, inclusion, and justice (DEIJ). For example, precedent scholarships by Dr. Deepak Subramony (2018, 2016, 2004) have highlighted the importance of power and positionality in I/LDT educational/learning interventions, and how it is important to provide a rich description of the power balance between the different groups in the contexts of such I/LDT studies. As such, Dr. Subramony (2018)—ahead of many scholars who started to advocate for DEIJ matters in I/LDT after the start of the COVID-19 pandemic—was able to provide a rigorous critique to I/LDT research by highlighting its lack of attention to DEIJ dimensions. Dr. Subramony (2018) articulated a strong rationale for why I/LDT needs to pay more attention to the LGBTQI community, basing his arguments on demographics, intersectionality, and systems thinking:

Frankly, I am dismayed that I have reason to write an article like this in mid-2017; that we as a field managed to get through the eight-year-long age of relative social and cultural enlightenment that was the Obama presidency without reforming our scholarly practice to acknowledge and embrace the needs of all stakeholders, especially those from historically marginalized, underrepresented, and underserved communities. Critical, feminist, antiracist, and postmodernist analyses remind us that all social research and scholarship is intrinsically political – see Hammersley (2000) for a comprehensive examination of the politics of social research. We social scientists – with our respected academic/professional credentials and our prestigious institutional affiliations to back us up – have the agency to choose what and whom we wish to focus our efforts on; and that choice is a function and a manifestation of our privilege – of our social, economic, political and cultural power. It appears that we as a field have thus far collectively chosen to not exercise our agency – our power and privilege – to focus our scholarship on the issues and needs of LGBTQI stakeholders (Subramony, 2018, p. 360).

2. To Provide Explanation

For example, to provide an explanation when aiming to understand the phenomenon of learning (or what ‘best’ learning design ought to be), we recommend that I/LDT researchers rely on critical theory and/or Critical Race Theory (CRT) to openly explain their values, biases, and experiences with the subject of their inquiry. Such explanations are crucial in drawing conclusions and, most importantly, explaining the position/world-view of the I/LDT researcher, without attempting to hide behind ‘objective-like’ language in the methods section of the manuscript. Through a process called bracketing, I/LDT researchers can speak to their position and their social location in order to address “issues of power and seek to reveal these relationships hidden within the research process” (Mao et al., 2016, p. 6). For example, precedent scholarship by Dr. Craig (Howard & Das, 2019) has highlighted how their values, biases, and experiences influenced what they designed and what kind of conclusions they drew on the subject of learning. As such, Dr. Craig

Howard was able to not only to understand his own values/perspectives on the subject of learning but also to share how this understanding impacted his views and collaborations with another scholar (Dr. Anupam Das):

Cultural perspectives between [co-author] and I became starkly obvious, but difficult to articulate. This design originated in an Indian context, but to write the case I needed to come to terms with the cultural assumptions behind design decisions, and behind potential interpretations of design decisions. The voice in my head was saying they are going to think he did this because of that, but that's not really true. Essentially, I was viewing the design from both the side of the reader and of the designer. It struck me that there were moments in the case where an understanding of Indian culture would greatly improve a reader's ability to understand the designers' rationale (Howard & Das, 2019, p.6).

Conclusion

A central argument of our recommendations is that the subject of design is the unifying element of I/LDT inquiry. Thus, I/LDT is a design discipline *par excellence* that belongs to the larger human tradition of design. Yet, it is reasonable to ask why we have not recommended that I/LDT researchers rely on well-established instructional design theories (those we know from the 'green books' of Dr. Charles Reigeluth and other notable AECT I/LDT scholars) or major/trending learning theories (e.g, connectivism, Siemens, 2005). That was by design. We believe that I/LDT researchers rely on these in-house theories for their work, already and substantively. However, because the I/LDT discipline is facing grand challenges ahead—in the post-covid-19 world of learning design—we believe that I/LDT researchers need to step out of their intellectual comfort zone and reach out to neighboring design disciplines. Without doing so, we believe I/LDT research will leave out crucial dimensions in discussing design for learning and will have a negative impact on our educational practices and on the whole discipline overall. As a solution, we recommend I/LDT researchers take advantage of the broader descriptive design theory, and rely on critical theory, in order to provide context, explanation, and critique to the I/LDT discipline altogether.

Certainly, merely taking advantage of the broader descriptive design theory, and relying on critical theory, in order to provide context, explanation, and critique to the I/LDT discipline altogether will not be *the solution*. We do not think such a problem lends itself to a simple process to be chosen/designed in order for the problem to be solved. The 'X' factor that we should not forget is our human agency. As we have mentioned earlier, we, as I/LDT scholars, should think of ourselves as the guarantors of our design work (Nelson & Stolterman, 2012), not the methods or processes we follow. In that regard, we think that theories, including the theories that we referenced in this paper, no matter how solid they are or where they are coming from, should be used in a *designerly* way (Lachheb & Boling, 2018; Stolterman et al., 2009). That is to say, we as researchers and designers place the theories at our service and do not let theories strictly dictate how to do our work in a limiting manner.

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