Instructional Design Theory: An Interdisciplinary Field

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As technology rapidly transforms the educational landscape, it is becoming increasingly clear that analyzing educational technology through a single lens cannot definitively yield an effective instructional process. Technology has historically pushed education into new realms, but recent rapid advances have had far-reaching implications not only in education, but the fields of psychology and sociology as well (Carr-Chellman & Rowland, 2016; Kalmbach, 1996; Kennedy, 2010). Many of education's learning theories are rooted in psychology; a multi-faceted approach to instruction is beginning to evolve. Rather than re-brand the field with each new evolution, this paper seeks to determine constants within the literature. The following definition for the term *Instructional Design Theory* is designed to incorporate the domains of instructional systems, instructional design, educational theories, and technology into a single field of study:

> Instructional Design Theory is the study and ethical practice of learning theories, systematic design, and creation, implementation, evaluation, and management of instructional processes and resources.

This literature review seeks to defend the notion that the individual fields of instructional systems, instructional design, education theory, and technology are interdependent variables. An all-encompassing term to reflect how the components directly relate to one another is necessary, as research in one of these fields will most likely impact the research in another (Gagné, 1987). This paper argues that limiting the definition of the field to Instructional/Educational Technology alone is ineffective; technology, as well as systems and design, are functioning domains of a larger instructional design theory.

Historical Definition

The concept of educational technology pre-dates the term itself. A publication in the 1930s introduced "radical" radio technology to the classroom (Harrison, 1938). With this technology came a need to justify its usage, as well as the design of instructional guidelines to effectively utilize it within the classroom and measure its success. Various definitions evolved to describe these technological concepts, but the first universally-accepted definition of educational technology was not established until 1963 by the Association for Educational Communications and Technology (AECT). The first definition attempted to capture the technologies used in that era, immediately dating the definition. In 1977, the AECT revised their definition, introducing a sixteen-page summary that reflected how challenging it is to define the field; the myriad of evolving components each required careful consideration and scrutiny (Association for Educational Communications and Technology, 1977). Over the years, scholars attempted to revise the definition further, seeking clarity and vision within the field. In 1994, Seels & Richey simplified the definition, creating a palatable version that encompassed the ever-evolving nature of technology by stating, "Instructional Technology is the theory and practice of design, development, utilization, management, and evaluation of processes and resources of learning" (Seels & Richey, 1994). This definition clarified the field as a theory and additionally recognized the importance of systems design, citing the Dick & Carey instructional design model, but also leaving the description open to explore more constructivist approaches (Seels & Richey, 1994). The latest iteration of a universally accepted definition came again as a revision by the AECT in 2008: "Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources" (AECT, 2008). This definition allows for a liberal interpretation of the term

"technology," while focusing on the creation, implementation, and assessment of instructional materials. Reiser and Dempsey (2018) point out that "one of the many strengths of the new AECT definition of educational technology is that the definition clearly indicates that a focus on systematic processes and the use of technological resources are both integral parts of the field. However, the importance of educational theory is minimized, leaving out the critical analysis of the learner. Kovinko & Marakly's (2017) analysis of educational technology definitions revealed the existence of three facets: they tend to be scientific in nature, they are procedural and descriptive, and they are procedurally effective. However, it is difficult to measure the effectiveness of the procedure without a thorough understanding of the learner, which requires knowledge of educational theory. Implementation of technology without an assessment plan also yields unmeasurable results. Each of these components function within a system of their own, yet each variable plays a part in the other. Consistently, each historical definition is either lacking one of the four domains, or does not address the importance of the domain in relation to the field as a whole.

Educational Vs. Instructional

The term "educational" versus "instructional" is often argued by pedantic scholars, utilizing the same reasoning to defend the use of their chosen word (Seels & Richey, 2012). While some researchers believe that choosing the correct term may be crucial to avoid alienating a large percentage of the academic population, both terms are consistently utilized to describe the instructional process, making it a key term to consider when defining the field. In 1986, Knirk and Gustafson argued that "instructional" relates to teaching and learning problems, while the term "educational" is too broad. However, Seels and Richey (2012) point out that "the stated goal in both was to effect the learning process." The AECT, founder of the original definition of

the field, has used the two terms reciprocally. While Seels and Richey (1994) were crafting their definition, they conceded that within the 30 years since its inception, the two terms are used interchangeably with a noted preference for "Educational Technology" in the UK, while US researchers prefer the term "Instructional Technology." As time progresses, the line between the two has become increasingly blurred.

Cho (2017) introduces an argument for the term "instructional" by pointing out that the learning process does not end upon completion of a formal education. Employment training shares the common goals of learning and performance with education (Cho, 2017). Research reflects several instructional design approaches are being formulated for the workplace, revealing that the term "instructional" reaches beyond the classroom (Edward J. Caropreso & Richard A. Couch, 1996; Dean, Ripley, Russell, & Cali, 1999; Jirasatjanukul & Jeerungsuwan, 2018). To create an all-encompassing term, "instructional" captures the process of learning across multiple disciplines, thereby making it the more desirable of the two options. While "educational" has been used within the corporate context, some researchers have acknowledged that the term brings to mind a mental image of a classroom (Seels & Richey, 2012).

Design

The field currently defines "design" in two major contexts: instructional systems design has been used to describe the systems where the instruction is delivered, and instructional design refers to the creation and delivery of the instructional materials (Dick, Carey, & Carey, 2005; Reiser & Dempsey, 2018). Both are equally important to the final learning outcome, thereby a consolidation of the terms allows the field label to be more concise while incorporating a broad range of discussion. A consolidation of the terms is also recommended due to the current research often using the two terms interchangeably (Carr-Chellman & Reigeluth, 2009).

Instructional systems design has evolved into a defined field, thanks to the work of designers such as Dick, Carey, Gerlach, Ely, and Kemp (Dick, Carey, & Carey, 2005; Gerlach, Ely, & Melnick, 1980; Kemp, 1985). These models are evolutions of earlier learning theories, incorporating learning principles created by Skinner, Bloom, Dewey, Gagne, and other visionaries in learning theory and instructional design . One form of instructional design gave way to the instructional system; this is due in part to the interdisciplinary studies within the field (Banathy, 1991). Learning theories, rooted in psychology, evolved into complex system designs in an effort to maximize learning (Carr-Chellman & Reigeluth, 2009). As educational theories continue to evolve, other influences are also starting to develop within the design process; maintaining the connections between these emerging concepts and theories as well as established successful practices are necessary to design an effective instructional system.

In 1994, Seels and Richey defined the field as a "result of the flowing together of three streams of interest: media in education, psychology of instruction, and systematic approaches to education." Since the publication of their definition, media technology has transformed instruction design, allowing not only the ability for both synchronous and asynchronous communication across the globe but also giving rise to the digital iteration of distance learning. These concepts radically transformed the traditional methods of instructional design, both for the designer and the learner. With each new evolution of technology, existing and emerging learning theories start to evolve, leading to an ever-expansive web of theories and design models (Bozalek, 2015). The term *Instructional Design Theory* incorporates all facets of these challenges, studying the evolution of the instructional process, defining effective practices, applying ethical considerations, and acknowledging and considering the effect these changes create on the interdependent pieces of the field.

Social sciences are currently making an impact on instructional design as well. Research reveals new fields merging with instructional technology, including "human performance technology (HPT), instructional design (ID), learning sciences (LS), human resource development (HRD), and human resource management (HRM)" (Cho & Yoon, 2010). Learning and performance are shared goals within these fields, and the need to address diversity and individual performance as it relates to the organization are driving the development and innovations of the educational design environment within these organizations (Cho & Yoon, 2010). While a singular approach to labeling these fields was sufficient in the past, the emergence of new innovations will continue to add additional fields of study. The one constant that has remained throughout these rapid changes is the creation aspect implied within the word "design." Weinstein and Shuck (2011) point out that "in its traditional application, instructional systems design has drawn exclusively on individual learning theories of learning, appropriate when the subject matter can be deconstructed into discrete tasks and effective individual learning." They go on to assert that "the challenge is that the structure of work in organizations has substantially changed in the latter half of 20th century" (Weinstein & Shuck, 2011). With each new innovation comes a new field of study with the same goal: to design an effective instructional model.

Technology

The preference for the term "technology" within the field has been problematic since the AECT's first iteration of a standard definition. Warner, Bell, & Odom (2018) identify the first problem: "Educational stakeholders, and the public at large, use the term technology as though it has a universally agreed upon definition. It does not, and how technology is defined matters."

This statement reveals the first weakness within the current field label; consistency is impossible without defined parameters.

The evolution of technology itself is also problematic. Kalmbach (1996) writes that "forms of technology emerged through the years, some with enduring educational value such as the graphite pencil, some that have faded into obscurity such as the typewriter." This issue is evident throughout educational research; technology is described as everything from a generic tool to a specific electronic device. Even the AECT, which has been responsible for every universally accepted definition of educational technology, has fallen prey to limiting the definition to a concrete concept, leaving the field with little room to grow.

Some researchers, such as Warner, Bell & Odom (1996), attempt to prevent constraints by classifying technology as a tool: "For technology in schools to support student learning, it must be defined in a way that describes technology as a tool for problem-solving." This description does align with Kovinko & Marakly's (2017) educational technology facet in that they are procedural and descriptive. However, to define technology for an entire field, the term is still problematic. Kalmbach's (1996) historical perspective may offer the best option for incorporating the concept of technology within the field: "By reminding ourselves of how teachers in the past have integrated new technology into their classrooms, we can better prepare ourselves for coping with innovations that might otherwise seem revolutionary." The field of instructional technology is fairly young and new technologies may appear revolutionary, but in the historical timeline of instructional design, technology has merely evolved like everything preceding it. Therefore, technology is just a domain of the design element within Instructional Design Theory, and not the primary focus.

Theory

The term "theory" references a body of theorems presenting a concise systematic view of a subject (Meriam-Webster, 2019). Bacharach (1989) frames the term within a research lens as "a statement of relationships between units observed or approximated in the empirical world." He also makes a clear distinction between a theory versus a definition, where "the primary goal of a theory is to answer questions," which is different from the term "description, which is to answer the question of what" (Bacharach, 1989). *Instructional design theory* encompasses several interdependent domains, each with observable relationships to one another. This term gives the researcher a full, systematic review of instructional design as a field. Domains include learning theories, instructional design, instructional systems design, and instructional technology. While "instructional design" could feasibly support the domains, the term "theory" reflects the information as a continuing field of study. A participant in the field is designated an Instructional Designer, and within the confines described here would have a thorough understanding of all the necessary elements to produce effective instruction.

Conclusion

While technology, standards, learning theories, and methods of instructional design have evolved through time, the general concept of instructional design has remained consistent; design must adapt to numerous variables to maintain effectiveness. Although Reigeluth (2009) asserts that "information-age educational needs are substantially different from industrial-age educational needs," the goals of instructional design have also remained consistent. The field continues to search for best practices, effective instruction techniques, and efficient tools to reach all learners, and we continue to do so by utilizing all of the research in our multidisciplinary

arsenal. The methodologies, theories, and technology have evolved, but the four basic domains have remained constant within the literature.

As we seek to encapsulate a number of variables into a manageable, consistent terminology, the term *Instructional Design Theory* can maintain those constant variables while allowing us to explore the relationships of the many components within. Determining a single, all-encompassing term for the field would give the us a measure of differentiation and flexibility while still connecting scholars in a single purpose; the design of effective instruction for all learners, in any environment.

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