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Enilda Romero-Hall

E-Ling Hsiao

Fei Gao

Bowling Green State University, gaof@bgsu.edu

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The (Re) Adaptability of Research Methodologies in the Instructional Design & Technology Field

Enilda Romero-Hall, Ph.D.
University of Tampa
eromerohall@ut.edu
(corresponding author)

E-Ling Hsiao, Ph.D.
Valdosta State University
ehsiao@valdosta.edu

Fei Gao, Ph.D.
Bowling Green State University
gaof@bgsu.edu

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In its revolutionary piece, *On The Origin of Species*, Darwin (1859) provided compelling evidence for the existence of the natural selection process. He described how species interact with their environments to cause variations in traits. Just like the species that Darwin explored in his research, the methodologies used in investigations related to the instructional design and technology (IDT) field have (re)adapted. This (re)adaptability serves to help us better inquire and explore the landscape of formal and informal educational learning environments available today.

In 1985, Howe published an article titled “*Two Dogmas of Educational Research.*” In this article, he advocated for post-positivist views in which researchers did not have to make a choice between value-laden, qualitative methods versus descriptive, quantitative methods. Instead, Howe (1985) stated there were no good reasons to avoid combination of methods. A few years later, other researchers continued to discuss the importance of qualitative research methods to provide findings that can be used to improve our understanding of learning, development, and education; these arguments were based on factors that affect the learning process such as individuals differences, chaos, and the role of freewill in human behavior, amongst others (Cziko, 1989). These early reasoning and positions regarding educational research continued to evolve from the traditional views of research as experimentation versus the more realistic understanding of the complexities of educational environments (Brown, 1992; Schoenfeld, 1992). This shift was not only focused on quantitative versus qualitative research, it was also a shift on location context (laboratories versus classrooms). Brown (1992) referred to this shift as a trade-off between experimental control and richness and reality.

Similar discussions related to methodologies also took places within educational researchers in the IDT field. For example, Winn (2002) provided a critical observation about experimental research in the IDT field. He stated design experiments can be successful at determining effectiveness; however, just like Brown (1992), he clarified it can also provide distorted views in settings where variables cannot be “controlled.” In response to Winn’s (2002) article, Mayer (2003) wrote a seminal piece in which he expressed “research should be issue-driven, not method driven” (p. 362). Research methods should be selected based on specific hypothesis and research questions (Mayer, 2003). In other words, research in the IDT field should vary based on the variables under examination. These early arguments have had an impact in our academic discourse and use of research methodologies; they have helped us (re)adapt to changing environments. Today we understand the importance of mixed methods, the richness of qualitative inquiry, and the limitations of findings based on location context. However, as alternative learning

environments emerge, our research questions evolve and so do our research methodologies.

We, as researchers in IDT, continue to look at effectiveness and efficiency. Yet, learning environments such as online instruction (asynchronous, synchronous, massive open online courses), digital social communities, makerspaces, interactive virtual experiences, learning design studios, and others, provide an opportunity to investigate more than just knowledge acquisition. IDT researchers are asking questions related to: types of interactions, content created, geolocation, applicability to practice, benefits and challenges, learners' and instructors' experiences, to name a few. We are no longer solely interested in the learning outcomes, we also want to know how, when, where, and why learning occurs.

Inside this Special Issue

In this issue of TechTrends, sponsored by the AECT Research and Theory Division, we aimed to focus on current innovative research methodologies in the IDT field. In these papers, researchers were rigorously using novel methods of data collection and analysis to advance knowledge in the field.

Research to Practice. In the article "Action research experiences for scholarly practitioners in an online education doctorate program: Design, reality, and lessons learned," Ismihan Arslan Ari, Fatih Ari, Michael M Grant, and William Morris described the design and techniques used by the Educational Technology program at the University of South Carolina to prepare scholarly practitioners with action research methods in the dissertation process of an online doctoral program. This article provides great insights and lessons learned through the process of empowering the students using action research. Given the rise and increasing number of IDT online master and doctoral programs, this article serves to aid program directors and faculty advising graduate students through a more practical thesis/dissertation research lens.

Brandy Brown Walker, Yuhan Lin, and Richard M. McCline wrote "Q-Methodology and Q-Perspectives® Online: Innovative research methodology and instructional technology" in which they aimed to bridge the research/practitioner divide by creating an explicit merger of the learning and research environments. The authors outlined how this methodology is suitable for research on perceptions of learning, efficacy of design, and technology adoption, among other topics. For researchers who are interested in this methodology, the article provides examples of the how Q Methodology in combination with Q-Perspectives® Online can serve to conduct real-time analysis in face-to-face, flipped and online classrooms.

Qualitative Research Online and Offline. Attempting to support researchers and practitioners in the IDT field to conduct phenomenological research, Keri Valentine, Theodore Kopcha, and Mark Vagle wrote “Phenomenological methodologies in the field of educational communications and technology.” The authors described the philosophical grounding and methodological variations of the more prominent approaches of phenomenological research (i.e., descriptive, interpretive, and post-intentional), as well as related issues and affordances. Central tenets of phenomenological research, such as lifeworld, attitudes, and intentionality are discussed. A critical element of this article is the illustration of IDT related research within this specific methodology, which allows us to gain an understanding of descriptive versus non-descriptive phenomenologies.

Jonathan Gratch and Scott Warren presented a novel approach to qualitative research in the IDT field combining critical ethnography and cine-ethnography named *Critical CinéEthnographic*. In the article titled “Critical CinéEthnographic methods: A new dimension for capturing the experience of learning in 21st century qualitative research,” Gratch and Warren discussed the communication and learning theories that are the backbone behind this ethnographic research approach. The authors provided step-by-step guidelines that assist researchers to a) capture through the use of digital tools the complex behaviors, powers dynamics, and process occurring in the learning environment and b) engage in the ethnographic critical reflection methodology.

“The embedded lesson approach to social media research: Researching online phenomena in an authentic offline setting” by Vanessa P. Dennen and Stacey A. Rutledge presented a qualitative research methodology to gaining an understanding of a digital learning environment, social media. **Most previous research that focused on learning and instruction within social media aimed to explore the behaviors of users within the different platforms.** In this article, Dennen and Rutledge used an embedded lesson to investigate the use and impact of social media on learners within a school setting. The embedded lesson approach prevented concerns regarding the ethics, consent, and privacy of the data collected.

Data Mining Methods. Royce Kimmons and George Veletsianos provided their expertise in the article "Public internet data mining methods in instructional design, educational technology, and online learning research." In this article, the authors situated their discussion on studies, conducted by their research group, that have led to an understanding of the challenges and benefits of public data mining. Research on large datasets on public domain have posed a new opportunity for IDT topics. This methodology can lead to extracting knowledge and gaining an understanding on topics through complex, interdisciplinary, and multidimensional data. Kimmons and Veletsianos illustrated

practical and methodological matters, as well as ethical guidelines that IDT researchers need to consider.

Another article that provides insights into public data mining methods, specifically to answer research questions related to geolocation of learners was written by Spencer Greenhalgh, Bret Staudt Willet, Joshua Rosenberg, and Matthew J. Koehler. In "Tweet, and we shall find: Using digital methods to locate participants in educational hashtags," the authors used a methodological foundation aiming to support the exploration of geographical issues in educational Twitter research. Methodological comparisons of machine learning and GPS coding are presented as well as human coding. The authors discussed the affordances and awareness that geolocation related research provides to the IDT field, such as locality and cultural learning context.

Physiological Research Methods. In "A methodological case study with mobile eye-tracking of child interaction in a science museum" Yon Ju Jung, Heather Toomey Zimmerman, and Koraly Pérez-Edgar presented a case on the use of mobile eye-tracking to collect precise information concerning the learners' visual attention and interactions in an authentic environment. This study demonstrates a promising, active, and unique approach of mobile data collection, unlike traditional stationary eye-tracking in a laboratory environment using a computer.

Lin Lin Lipsmeyer and Thomas Parsons discussed core literature of media multitasking and its effect on learning in "Ecologically valid assessments of attention and learning engagement in media multitaskers." The authors discussed the complexity of research involving media multitaskers given the dynamics between learning concepts, theories, and frameworks. In this article, Lipsmeyer and Parsons described new approaches, using electroencephalography and virtual reality, to test everyday multitasking behaviors and move backwards to assess how a succession of actions precede a behavior in everyday activities.

Taking a Bird's Eye View. In the article "Meta-Analysis and Meta-Synthesis Methodologies: Rigorously piecing together research," Heather Horne Leary and Andrew Walker reviewed and illustrated meta-synthesis and meta-analysis procedures within the context of IDT research. These methodologies are often referred to as taking a bird's eye view. In this article, Leary and Walker addressed the importance of meta-synthesis and meta-analysis in providing trends and gaps in the literature about topics relevant to the field. They also discussed how these research methodologies allow us to evaluate and improve research. The article provides a great overview of traditional, as well as recent innovations and variations to these two types of research methodologies such as Bayesian Network Meta-analysis.

Looking Ahead

The articles in this special issue serve to represent a range of methodological research forms. We are aware there are other forms of emerging research methodologies used to explore IDT processes and outcomes. However, with this special issue, we aimed to provide a range of articles that illustrate how: a) our research interest have changed, b) our research questions adjusted, and c) the methodologies we used to answer the questions have (re)adapted. Research has shown most studies published in IDT related journals present traditional quantitative and qualitative paradigms (West & Borup, 2014). Our goal has been to promote, present, and disseminate articles that can aid others IDT researchers in their intent to address and investigate the evolving learning environments accessible today.

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