A Model for Developing Interdisciplinary Research Theoretical Frameworks

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Abstract

Embedded in interdisciplinary research, just as in disciplinary research, are statements of purpose, theoretical frameworks, research questions, reviews of literature, methodology, findings, recommendations, and more However, one of the least understood aspects of interdisciplinary research is the interdisciplinary research (IDR) theoretical framework. This article is intended to serve as a platform for dialogue within and across disciplines about interdisciplinary research and interdisciplinary theoretical frameworks. In addition, it provides a model for developing an IDR theoretical framework through an illustrative example of how an IDR theoretical framework was created and used within a dissertation study. We conclude the article noting critical elements about IDR and IDR theoretical frameworks for students and researchers to consider for enhancing their research.

Keywords

Interdisciplinary Theoretical Research Framework (IDR Theoretical Frameworks), Interdisciplinary Research (IDR), Theoretical Framework, Qualitative Educational Research

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Acknowledgements

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Embedded in interdisciplinary research, just as in disciplinary research, are statements of purpose, theoretical frameworks, research questions, reviews of literature, methodology, findings, recommendations, and more However, one of the least understood aspects of interdisciplinary research is the interdisciplinary research (IDR) theoretical framework. This article is intended to serve as a platform for dialogue within and across disciplines about interdisciplinary research and interdisciplinary theoretical frameworks. In addition, it provides a model for developing an IDR theoretical framework through an illustrative example of how an IDR theoretical framework was created and used within a dissertation study. We conclude the article noting critical elements about IDR and IDR theoretical frameworks for students and researchers to consider for enhancing their research. Keywords: Interdisciplinary Theoretical Research Framework (IDR Theoretical Frameworks), Interdisciplinary Research (IDR), Theoretical Framework, Qualitative Educational Research

As issues affecting the world and society become ever more complex, research that is interdisciplinary is rapidly becoming more needed and valued. According to a report collaboratively written by The National Academies of Sciences, National Academy of Engineering, and Institute of Health of the National Academies (2005), interdisciplinary research (IDR) is driven by the need to address complex problems that cut across traditional disciplines, and the capacity of new technologies to both transform existing disciplines and generate new ones. Foundations, institutes, and disciplinary associations address interdisciplinary research. For example, the National Science Foundation (NSF, 2017) in the *Introduction to Interdisciplinary Research* articulates the importance of interdisciplinary research, maintaining that "important research ideas often transcend the scope of a single discipline or program" (para. 1). As such, the NSF gives high priority to promoting interdisciplinary research and supports it through a number of specific solicitations (e.g., Science, Engineering, and Education for Sustainability; Networking and Information Technology Research and Development; and the National Nanotechnology Initiative). Furthermore, the National Institutes of Health (NIH, 2017) foster collaboration through the Interdisciplinary Research Program Consortia, an approach to research that allows for self-assembly (teams of scientists) and integration of multiple research components that addresses a common research topic.

Embedded in interdisciplinary research, just as in disciplinary research, are statements of need, theoretical frameworks, research questions, reviews of literature, methodology, findings, recommendations, etc. However, one of the least understood aspects of interdisciplinary research is the IDR theoretical framework. This article is intended to serve as

a platform for dialogue within and across disciplines about interdisciplinary research and interdisciplinary theoretical frameworks. In addition, it provides a model for developing an IDR theoretical framework. An illustrative example of how an IDR theoretical framework was created and used is provided for clarity. The article concludes with critical elements about IDR and IDR theoretical frameworks.

Interdisciplinary Research

While interdisciplinary research is discussed in many ways in the literature, the National Academies of Science, Engineering, and Medicine provide a succinct definition. They maintain that IDR is

> . . . a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice. (2005, p. 2)

Unlike research incorporating components of disciplinary knowledge from other disciplines or absorbs one type of work, IDR focuses on the intentionality of integrating knowledge. The Academies further explains that IDR is distinct from disciplinary "borrowing" and multidisciplinary research. Borrowing research refers to the use of a discipline's methods, skills, or theories in a different discipline. Sometimes what is borrowed is assimilated so completely that it resides in two disciplines and its origin is obscured. An example is the borrowing of charrettes (collaborative session focused on developing a solution to a design problem) from landscape architecture and for use in education where students create concise, illustrative portfolios on one topic to document learning and aid in decision making (Pate, 2013). Charrettes now are used in both landscape architecture and in education. Multidisciplinary research, according to the Committee on Facilitating Interdisciplinary Research (2004), refers to research that involves more than a single discipline in which each discipline works separately on distinct aspects of a problem. Figure 1 presents a visual of the intentionality of IDR in contrast to multidisciplinary research.
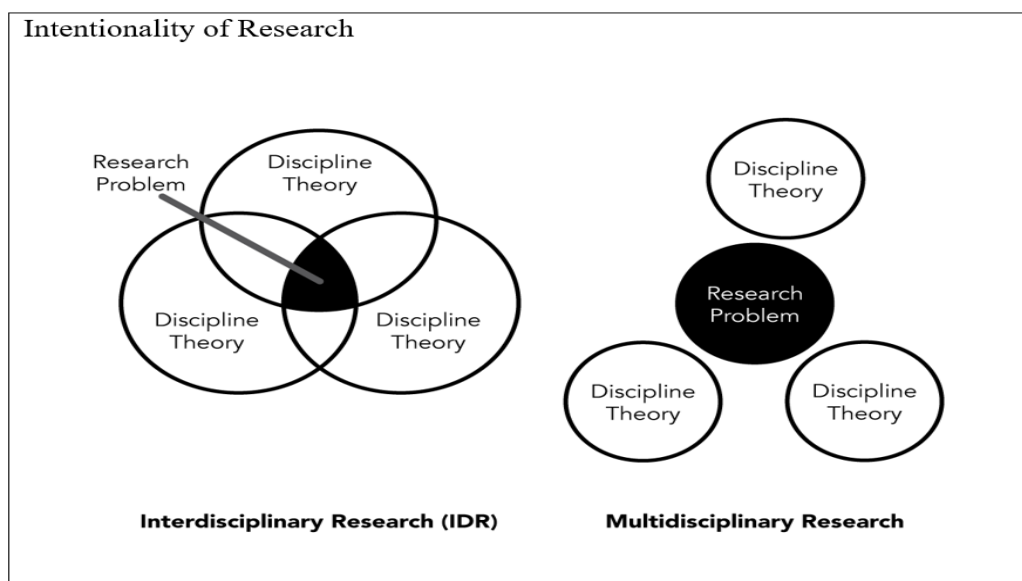

Figure 1. Intentionality of interdisciplinary research in contrast to multidisciplinary research.

The idea of interdisciplinary research is not to have disciplinary perspectives separate from one another, but instead integrated, "Research is truly interdisciplinary when it is not just pasting two disciplines together to create one product but rather is an integration and synthesis of ideas and methods" (National Academies of Science, Engineering, and Medicine, 2005, p. 26). Interdisciplinary research can be seen then as providing a means for going beyond one viewpoint, or the potential disciplinary "tunnel vision" typical of academic work (Klein, 1990) and instead integrating insights from multiple disciplines to get a broader understanding of the topic (Moran, 2010). Examples of interdisciplinary research, whether conducted by an individual or a team of researchers, are becoming more prevalent as foundations and organizations are increasingly encouraging and supporting such a research approach. We can see purposeful interdisciplinary research both within the US and abroad, such as the use of interdisciplinarity to enhance cultural awareness (CohenMiller, Faucher, Hernández-Torrano, & Brown Hajdukova, 2017), an outcome of a study supported by the Newton-Al-Farabi Partnership Programme, jointly funded by the U.K. Government and the Government of the Republic of Kazakhstan.

Disciplines in Interdisciplinary Research

The term "discipline" in interdisciplinary research is used broadly and with various connotations. Therefore, an understanding of the discipline is a prerequisite for understanding interdisciplinary research. According to the Interdisciplinary Social Sciences Research Network (2017),

> Disciplines represent fields of deep and detailed content knowledge, communities of professional practice, forms of discourse (of fine and precise semantic distinction and technicality), areas of work (types of organization or divisions within organizations such as academic departments or research organizations), domains of publication and public communication, sites of common learning, shared experiences of apprenticeship into disciplinary community, methods of reading and analysing the world, ways of thinking or epistemic frames, even ways of acting and types of person. (para. 2)

The Network further explains that disciplines "delineate the boundaries of intellectual community, the distinctive practices and methodologies of particular areas of rigorous and concentrated intellectual effort, and the varying frames of reference used to interpret the world" (para. 2).

Identifying disciplines by name can be confusing, as there are multiple interpretations of terms. Szostak, Gnoli, and López-Huertas (2016), in *Interdisciplinary Knowledge Organization*, refer to disciplines as "knowledge communities." Repko and Szostak (2017) identify three broad categories of traditional or established disciplines: natural sciences, social sciences, and humanities. They further state that in addition to these categories are the fine and performing arts (art, dance, music, and theater) and the applied and professional fields (business, communications, criminal justice and criminology, education, engineering, law, medicine, nursing, and social work).

Sometimes researchers use "sub-disciplines" or "fields of inquiry" to frame their work but still reference them as disciplines. For example, sociology is a sub-discipline in the established discipline of social sciences. A field of inquiry (Beane, 1995) can be fluid, often connecting with other disciplines to create interdisciplinary fields (Klein, 1990). Cybersecurity could be considered a field of inquiry stemming from the disciplines of Business, Science, and Engineering.

Theory in Interdisciplinary Research

An understanding of theory is also a prerequisite for understanding interdisciplinary research. Theory is composed of concepts, constructs, and propositions (Anfara & Mertz, 2006), a set of related ideas. Concepts are beliefs or cognitions, words assigned to group similar things (e.g., customs), events (e.g., marriage, motherhood), and people (e.g., undergraduates, faculty). Constructs are comprised of sets of concepts. Constructs are inferred from commonalities among observed phenomena and that can be used to explain those phenomena (Gall, Gall, & Borg, 2005). According to Anfara and Mertz (2006), propositions are expressions of relationships among a cluster of constructs. Theory results from the relationship of propositions. Examples of theories include social capital (sociology), attachment theory (psychology), syncretism (anthropology), and critical pedagogy (education).

Assuming theory is critical within a research study, it should provide a simple, tentative explanation of the observed relations relevant to a phenomenon, along with means for verification and revision (McMillan & Schumacher, 2001). Many studies use theory as an explicit or implicit framework that guides the research. In other studies, it is used as both theory and a research strategy. Ultimately, theories evolve and new ideas develop to help explain concepts, constructs, and propositions. For example, feminist theory has evolved throughout the decades with various theoretical streams emphasizing applications such as political involvement, employment, home life, gender expression, mothering, and diversity to name a few. While there are multiple ways to sort feminist theories, one way is through classification into branches such as Liberal, Marxist, Socialist, Transnational, Radical, Lesbian, Psychoanalytic and Cultural, Standpoint (Lorber, 2012). Others identify additional streams such as multicultural/global, ecofeminist, and matricentric feminist theories (O'Reilly, 2016).

Theories encompass a variety of levels, such, as grand, mid-range, and explanatory (Anfara & Mertz, 2006) and are laden with terminology. Zeichner (2005) asserts that terms " . . . should be defined clearly, consistently, and with enough specificity to enable the accumulation of knowledge across studies" (p. 740). However, when theories come from different disciplines this becomes more problematic especially if the disciplinary perspectives utilize distinct language. For example, socioculturalism may be interpreted differently between education, anthropology, and sociology researchers. Theory in IDR is even more complex than in disciplinary research. In interdisciplinary research, there is a need to have a shared language across disciplines when describing theories. It is hard enough to identify theories within a discipline and harder still to identify theories across disciplines if there are no clear definitions of terms.

Theories can be identified in multiple ways. Research question(s) may be analyzed to identify key concepts, constructs, and propositions, which can then be used in conducting an internet search. Academic articles or book references can be reviewed to identify theory and theorists. Theories can be identified through other researchers or through your own knowledge about the discipline(s).

Interdisciplinary Research Theoretical Frameworks

An interdisciplinary research theoretical framework can be thought of as a purposeful identification of theories across disciplines, an orientation which provides guiding perspectives for research and practice. If interdisciplinarity allows solutions beyond one discipline (Moran, 2010), likewise IDR theoretical frameworks would also provide access to additional understanding and solutions. Within an IDR theoretical framework, there are different but interrelated factors. There is an assumption that intentionally examining problems and issues from multiple disciplines is critical.

There is no clear definition of the use of an IDR theoretical framework, which at times can be elusive, as sometimes the terms multidisciplinary or transdisciplinary are used. Interdisciplinary theoretical frameworks keep discipline theories separate and integrated, multidisciplinary theoretical frameworks keep discipline theories separate, and transdisciplinary theoretical frameworks integrate discipline theories. Furthermore, there are various types of theoretical frameworks, with some that focus on methodology or paradigms, such as in qualitative research (Anfara & Mertz, 2006). Likewise, there are usually multiple frameworks from which to view the same problem.

An additional aspect of the IDR theoretical framework, when applied from the beginning of a research project, is its use as an aid in understanding the literature. As an analytic frame for studying the research topic, theoretical perspectives from multiple disciplines are integrated, explaining how each informs the topic/research question.

One way to think about IDR theoretical frameworks is to consider the example of systems thinking. Systems thinking (a theory) is analogous to an interdisciplinary theoretical framework. Systems thinking is a theoretical perspective for learning about and understanding how groups of interrelated components form complex wholes. Systems thinking focuses on the study of how one component interacts with another component of the system—a set of elements that interact to produce behavior—of which it is a part. Instead of isolating smaller and smaller parts of the system being studied, systems thinking works by expanding its view to take into account larger and larger numbers of interactions as an issue is being studied (Aronson, 1998). Systems thinking is important in understanding the complex whole (IDR theoretical framework) and how groups of interrelated components (disciplinary theories) form the complex whole.

One of the challenges of using an IDR theoretical framework for research is the application across the research study. Instead of only using the theories to provide a lens for thinking of the topic, the interdisciplinary theoretical framework should be used *across* the research study from the problem statement, research question, review of literature, methodology, data analysis, to recommendations (CohenMiller & Pate, 2016). Within each of these sections, the IDR theoretical framework is used as the foundation and is continually considered and addressed. Thus, it is necessary for researchers to be able to explain their findings within the developed framework. For instance, researchers would consider the results of their study and ask themselves, how does the research support, advance, or refute the theories in the interdisciplinary framework, if at all?

Furthermore, there are implications regarding the number of theories used across an IDR project. If the IDR involves a team of researchers from across disciplines, then consensus should be built about the overarching theories of the project. This may be best facilitated through the use of a logic model. In this case, a logic model is a systematic and visual way to present and share relationships (W. K. Kellogg Foundation, 2004) among the overarching theories in the IDR. If an individual researcher conducts the IDR project, then decisions about overarching theories are made by that one researcher. In either case, limiting the number of overarching theories is advisable in order to reduce complexity and allow for integration and synthesis of ideas, methods, and conclusions. Secondary theories are then used for specific research activities within the IDR project.

Model for Developing an IDR Framework

In thinking about the development of an IDR theoretical framework, we suggest a 5-step model:

Step 1. A research topic/question(s) addressing a complex problem that purposively cuts across disciplines is identified or co-identified.
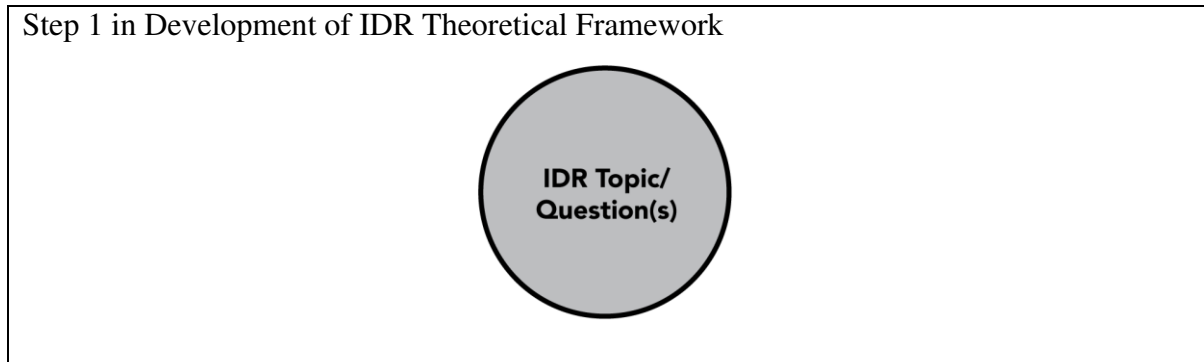
Step 1 in Development of IDR Theoretical Framework

**IDR Topic/
Question(s)**

Figure 2. Purposively identified IDR Topic/Research question(s).

Step 2: Concepts and constructs within the IDR topic/questions(s) are identified.

Step 2 in Development of IDR Theoretical Framework

Concepts/
Constructs

Concepts/
Constructs
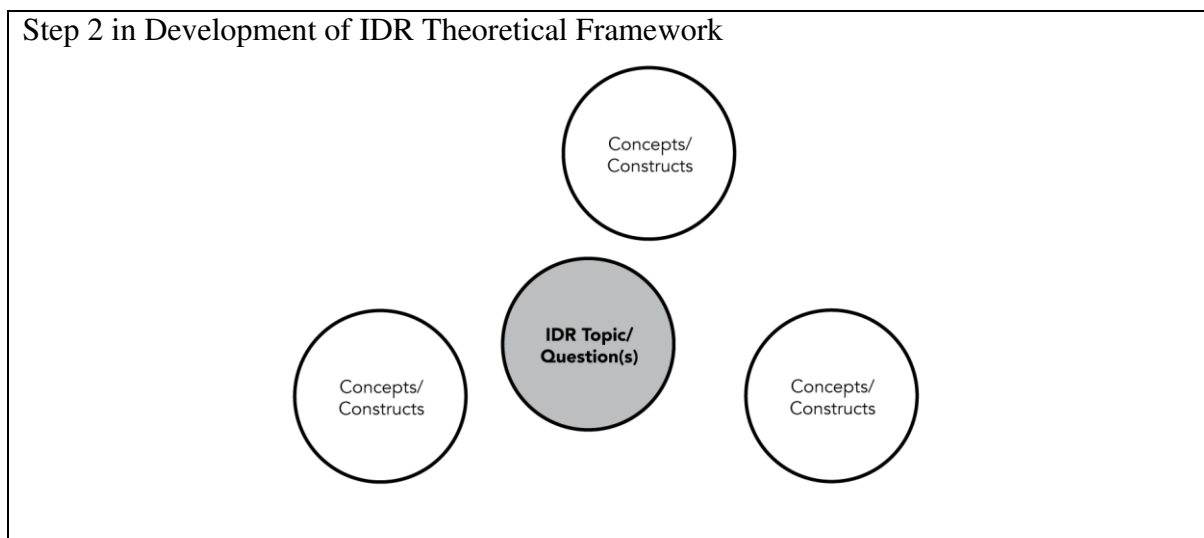
**IDR Topic/
Question(s)**

Concepts/
Constructs

Figure 3. Identification of concepts and constructs within IDR topic/questions(s).

Step 3: Using concepts and constructs as guides, disciplines are identified, considered, and chosen. Disciplines, in this step, are kept distinct and in focus.
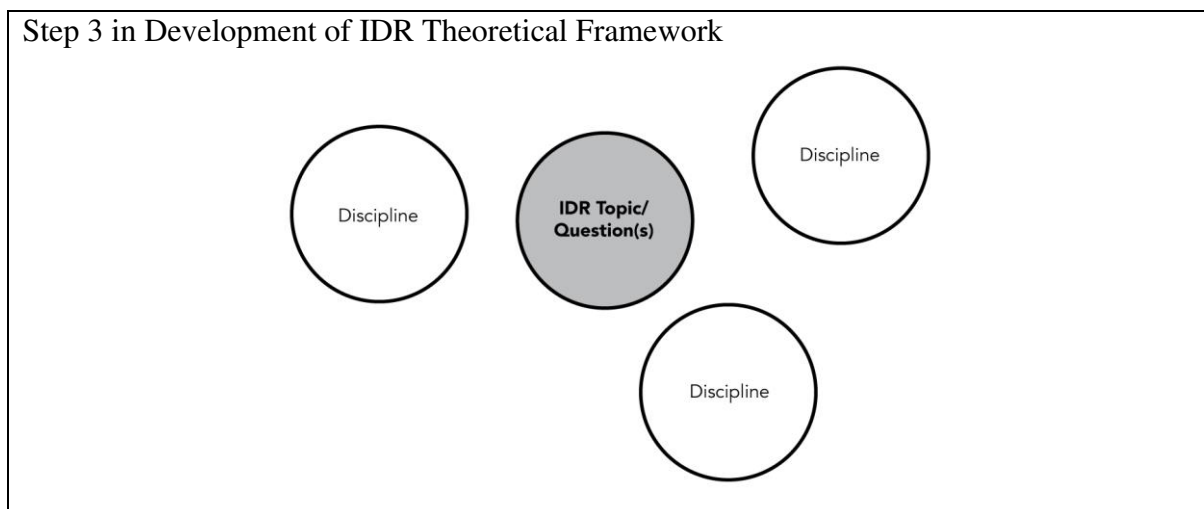
Step 3 in Development of IDR Theoretical Framework

Discipline

**IDR Topic/
Question(s)**

Discipline

Discipline

Figure 4. Identification of distinct disciplines (or sub-disciplines or fields of inquiry) identified.

Step 4: Using concepts and constructs as guides, theories appropriate for addressing the research topic/questions within disciplines are identified (e.g., Internet searches, search of article and book references), considered, and chosen. Theories and disciplines, in this step, are kept distinct and in focus.
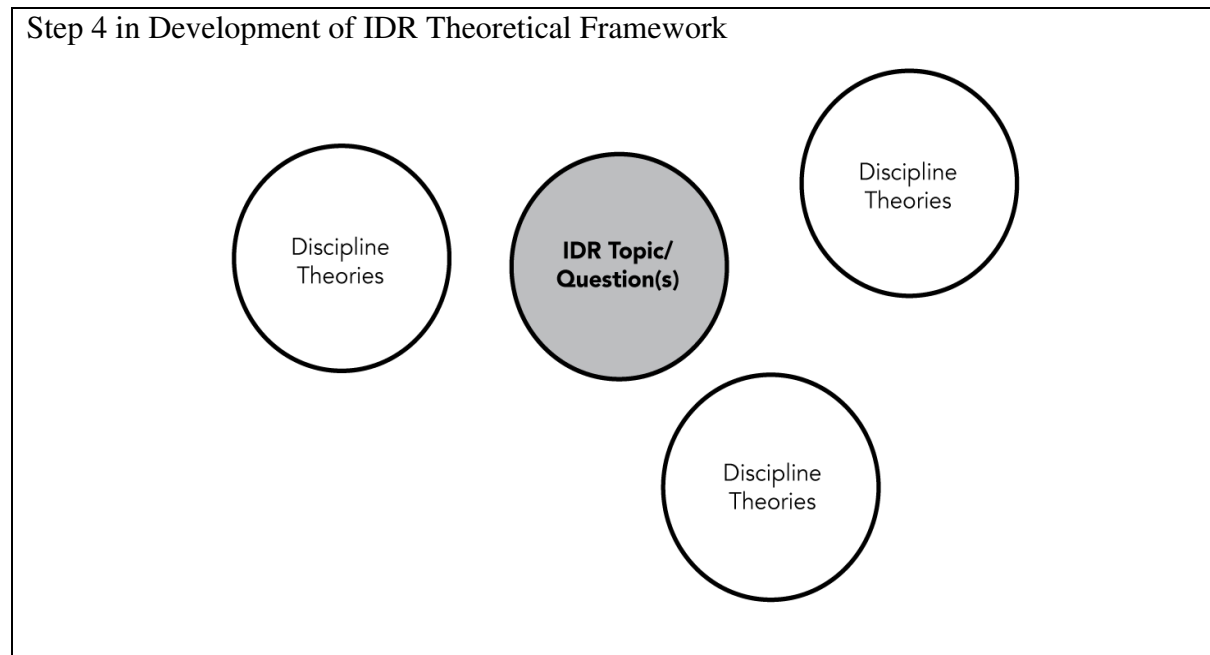
Figure 5. Identification of theories distinct to disciplines (or sub-disciplines or fields of inquiry) identified.

Step 5: Key terminology within theories and across disciplines are clarified and defined as shared language. It is at this step that theories and disciplines become less distinct and more blurred.
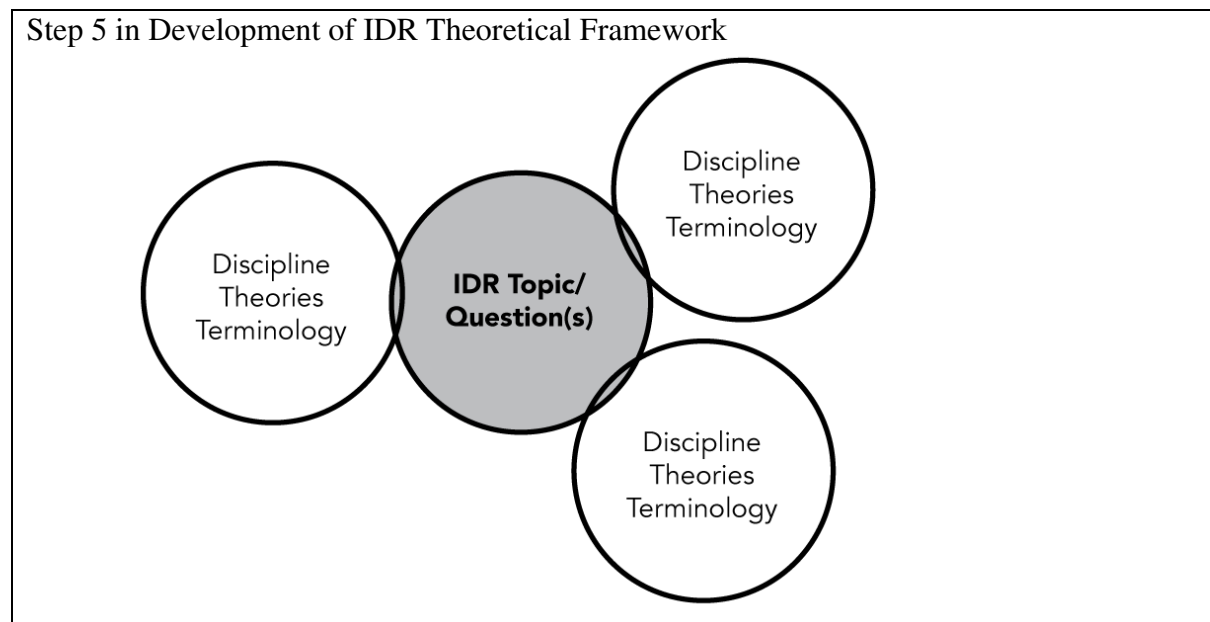

Figure 6: Identification of interdisciplinary shared language across disciplines (or sub-disciplines or fields of inquiry) and theories.

Example of Construction and Use of an IDR Theoretical Framework

In order to further explain how to construct and use an IDR theoretical framework, we will introduce an example study. The first author of this article, for her IDR dissertation, was interested in qualitatively studying the experiences of students who became mothers for the first time while in their doctoral program. Her research topic was: Doctoral Student Motherhood/Mothering in Academia. The research question was: How do doctoral students describe their experiences of motherhood/mothering in academia?

To return to the suggested 5-step model for the development of an IDR theoretical framework, the following demonstrates the way the steps were used in practice.

Example of Step 1: A research topic/question(s) addressing a complex problem that purposively cuts across disciplines was identified.
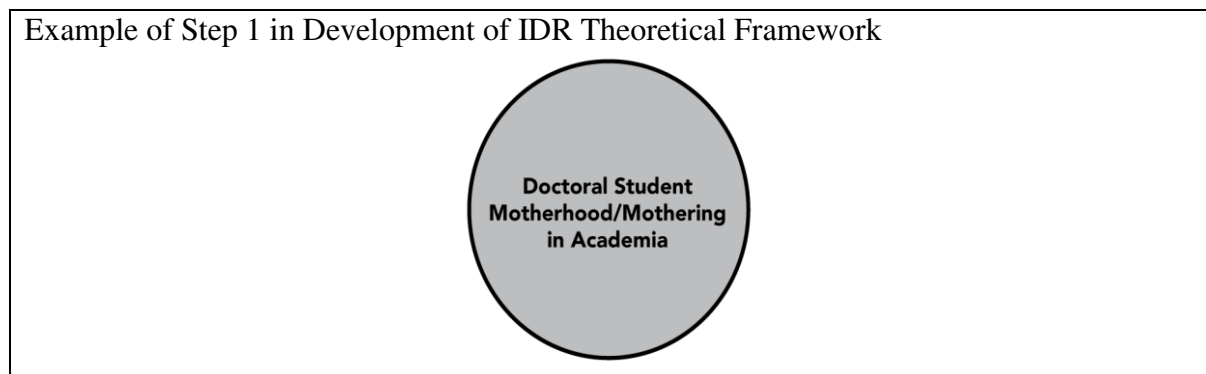

Figure 7. Doctoral student motherhood/mothering in academia purposively identified as IDR topic.

Concepts identified within the research topic/question varied from beliefs to motherhood as an "institution" (Rich, 1995), mothers as graduate students, to the experience of being a doctoral student mother. Constructs addressed *motherhood* as an institution affected by sociocultural expectations and beliefs (Hays, 1996; O'Reilly, 2004; Ridgeway & Correll, 2004; Ruddick, 1989), *mothering* as an experience of sociocultural and historical forces (Hays, 1996; O'Reilly, 2007; Rich, 1995; Ruddick, 1989), and *negotiation* and *navigation* within academia as a doctoral student mother.

Example of Step 2: Concepts and constructs within doctoral student motherhood/mothering in academia were identified.
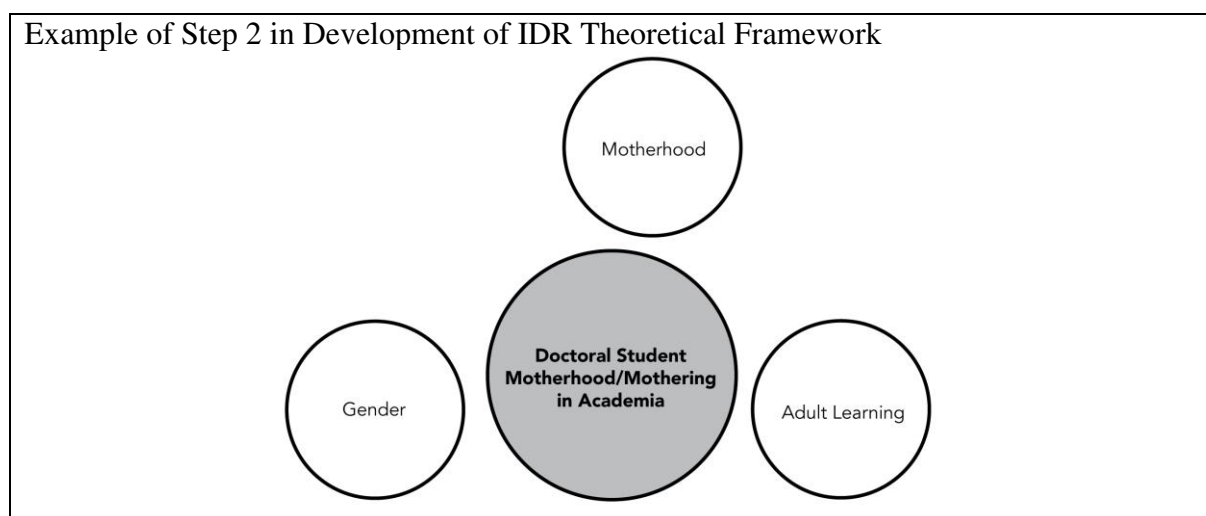

Figure 8. Concepts and constructs within IDR topic of doctoral motherhood/mothering in academia were identified.

With any literature search there is a need to organize it in some manner, and with the interdisciplinary nature of the search conducted, there were a vast number of texts to sort through. Multiple venues were taken to locate relevant research relating to doctoral student motherhood/mothering in academia. Such venues included reading scholarly articles and books, searching online, reviewing references from others' works, attending presentations and discussing the topic and relevant issues with colleagues in relevant fields, ultimately leading towards an interdisciplinary perspective. Using these venues, the analysis began with a vast number of texts, to an organized smaller set, finally to those with an explicit theoretical underpinning. This step focused on arranging the literature by disciplinary perspectives.

Example of Step 3: Using concepts and constructs as guides, the next step was to identify the disciplines that effectively addressed the topic. In this case, disciplines addressing doctoral student motherhood/mothering in academia were identified, critically considered, and selected. At this point in the process, the disciplinary perspectives were not yet integrated but kept distinct. In other words, each discipline retained its unique focus.

Example of Step 3 in Development of IDR Theoretical Framework
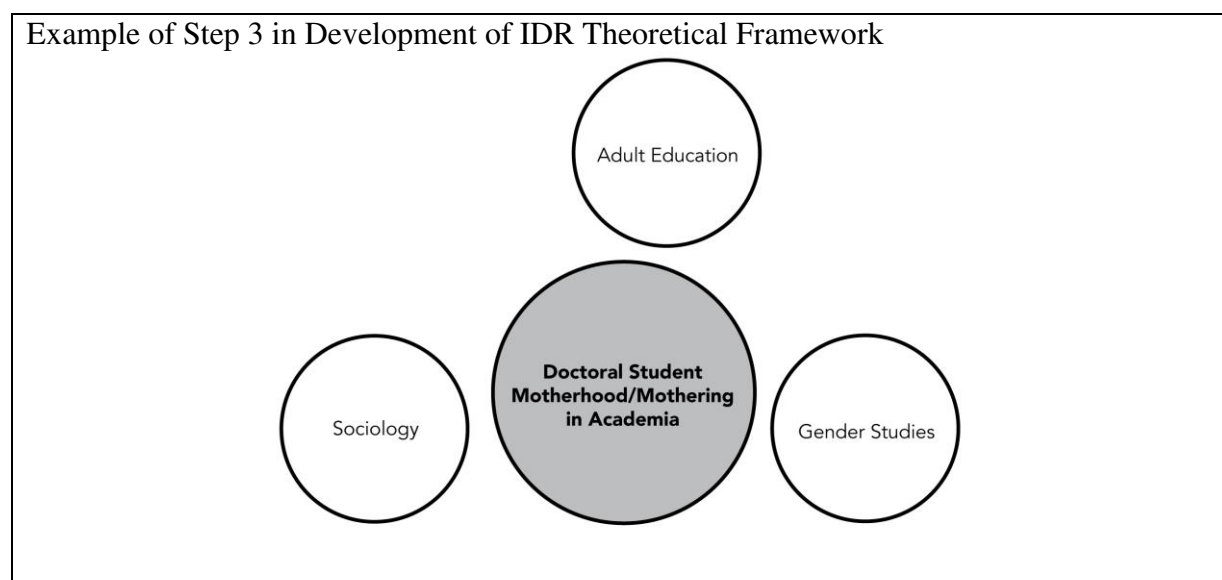
Figure 9. Disciplines (or sub-disciplines or fields of inquiry) of sociology, adult education, and gender studies addressing IDR topic of doctoral student motherhood/mothering in academia chosen.

Example of Step 4: Using concepts and constructs as guides, theories appropriate for addressing doctoral student motherhood/mothering in academia were identified (e.g., Internet searches, search of article and book references), considered, and chosen. Theories and disciplines, in this step, were kept distinct and in focus.

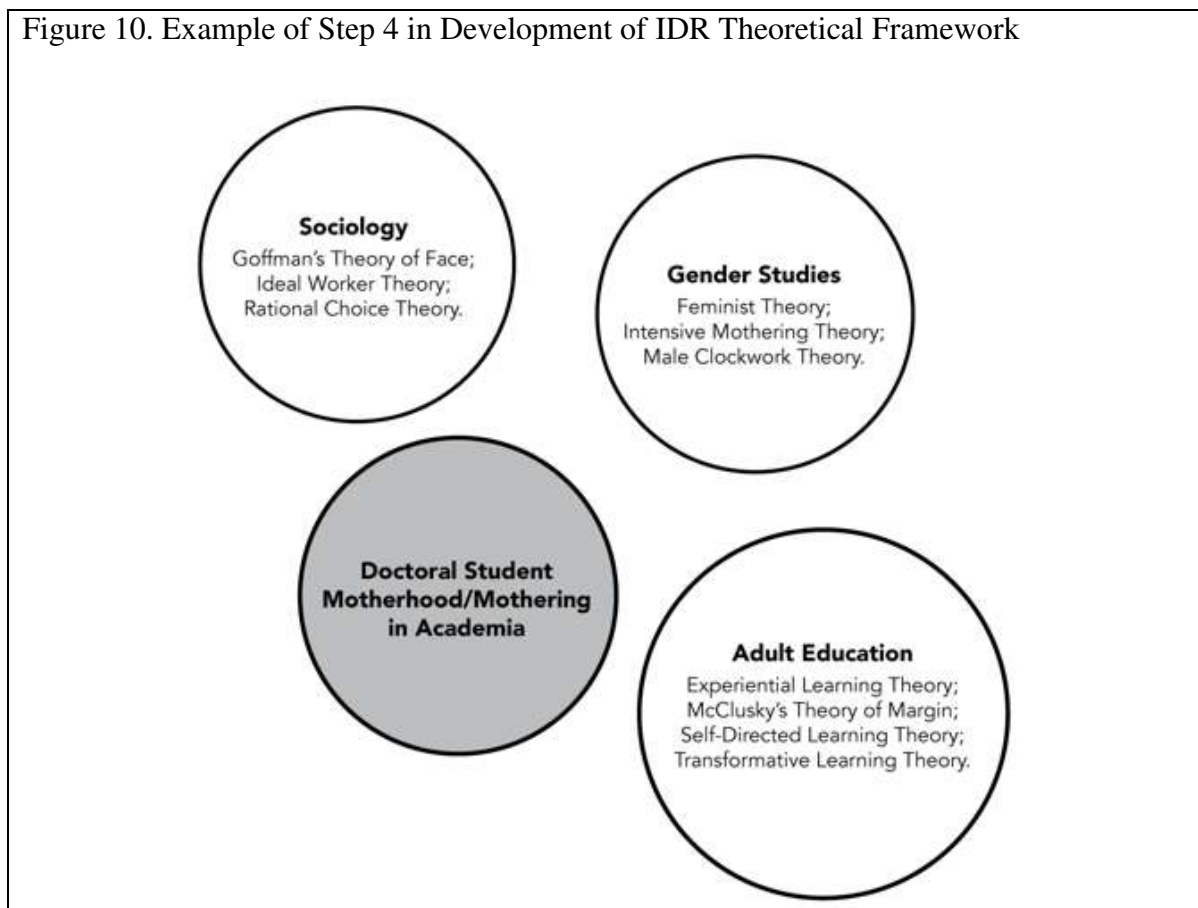Figure 10. Example of Step 4 in Development of IDR Theoretical Framework

Figure 10. Theories within disciplines (or sub-disciplines or fields of inquiry) addressing IDR topic of doctoral student motherhood/mothering in academia chosen and kept distinct and in focus.

In this step, the analysis of the literature was addressed—the literature that came from multiple disciplines, but which was not yet integrated. A grid/table was developed in Microsoft Word to organize the various theories (see Table 1). The organization of the literature was categorized by similarities and differences across the texts. In particular, throughout this process, the goal was to discover theories and theoretical frameworks and how they could be interrelated, if at all. The table included major categories related to each article with spaces for descriptions.

The literature table included typical aspects such as title, methodology, participants, data sources, and analysis method(s) used. While many of these features are often commonly articulated in research articles, the next category—the theoretical frame—is less often directly stated. Because the theoretical frame(s) were not always explained, at times this meant examining the article as a whole for evidence of potential theories. If theories were not clearly articulated, the next few categories helped shed light on the potential frameworks. The next category was to identify the key definitions in the study as explained by the author, then the guiding research question(s), and lastly, the author(s) disciplinary perspective.

Considering that many research articles do not directly articulate a theoretical framework, the author(s) disciplinary perspective (which may at times mean researching into the background, publications, and department in which they work) provided insight into the potential theories guiding the study. The final steps for the literature table analysis included identifying the findings and how the study filled a gap in the literature.

By filling in a table of these different categories, it was possible to more easily see common features that could be compiled and compared across articles. Thus, by filling in the table bit-by-bit, article by article, there was a process of constant comparison (Glaser & Strauss, 1967) between articles as a type of literature analysis.

Table 1. Organization to analyze texts in developing an interdisciplinary theoretical framework for research. Sample table excerpt used in the dissertation (CohenMiller, 2014).

Study	Methodology	Participants	Data sources	Analysis	Theoretical frame
Armenti (2004) May babies and post tenure babies: Maternal decisions of women professors	qualitative feminist methods	19 Canadian professors from one Canadian university, across ranks and departments, tenured/tenure track, 30-60yrs. Women with children or who were considering having children (this was narrowed by the requirement letter that specified an interest in "family")	in-depth, qualitative interviews 90-120 minutes (interview questions focused on relationship between personal and professional life, timing of childbirth, child-care arrangements, accounts of career progression, strategies for time management, and usefulness of family-centered university policies (p.216)	developed a coding system to "interpret" the experiences of the women interviews relating to career and family dynamics, methods triangulation (guided by feminist interview research collected interviews, background info, documents), thick description of the stories. Content analysis of documents (directors, calendars, handbooks, policies and procedures, and university literature - newspapers, newsletters, pamphlets and flyers). Specifically looked for "organizational policies and practices that perpetuate gender inequalities" and compared it with the interviews (p. 216).	critical feminist theory - emphasizing the social construction of gender, and the relationship to power, organizational culture and policy
Definitions (their critical definitions)	Research questions	What discipline are they coming from	Findings	how it fills a gap in the literature	
feminist perspective - to enhance women's lives; "May babies" - the choice of	Do women academics have children before or after tenure? In what ways to the women's stories link the	Armenti's background - adjunct professor in Ed policy, foundations,	Some women in the study attempted to control childbirth timing for the sake of their careers (p.218) - May babies and post tenure	discussion of childbirth timing for academics	

The first table of key features helped narrow the texts that directly included theoretical frameworks. In order to find an IDR framework, this developing table was then sorted based upon theoretical frameworks (see Table 2). Through this process of narrowing in on the theories used within each text, patterns began to emerge to frame the developing study. The emerging theoretical patterns indicated three major disciplines (or sub-disciplines or fields of inquiry) that addressed the topic of doctoral student motherhood/mothering in academia. These disciplinary and theoretical perspectives came from: gender studies, sociology, and adult education. Within each, there was likewise associated theories discovered that addressed similar topics. Developing this secondary table provided a straightforward manner in which to organize the research studies by theory.

Table 2. Research studies in doctoral student motherhood/mothering in academia classified by theoretical frame. Sample table used in the dissertation (CohenMiller, 2014).

GENDER STUDIES	SOCIOLOGY	ADULT EDUCATION
Feminist theory (Armenti, 2004; Gerten, 2011; Hill et al., 2011; Philipsen, 2008; Williams, 2007)	**Goffman's theory of face** (Williams, 2007)	**Experiential learning** (Tiu Wu, 2013)
Intensive mothering theory (Lynch, 2008)	**Ideal worker theory** (Ward & Wolf-Wendel, 2004)	**McClusky Theory of Margin** (Grenier & Burke, 2008; Tiu Wu, 2013)
Male clockwork theory (Ward & Wolf-Wendel, 2004)	**Rational choice theory** (Wolf-Wendel & Ward, 2006a)	**Self-directed learning** (Tiu Wu, 2013)
	Role conflict theory (Lynch, 2008; Tiu Wu, 2013; Ward & Wolf-Wendel, 2004)	**Transformative learning** (Tiu Wu, 2013)

Example of Step 5: Key terminology within theories and across disciplines addressing doctoral student motherhood/mothering in academia was clarified and defined as shared language. Theories and disciplines (or sub-disciplines or fields of inquiry) became less distinct and more blurred.

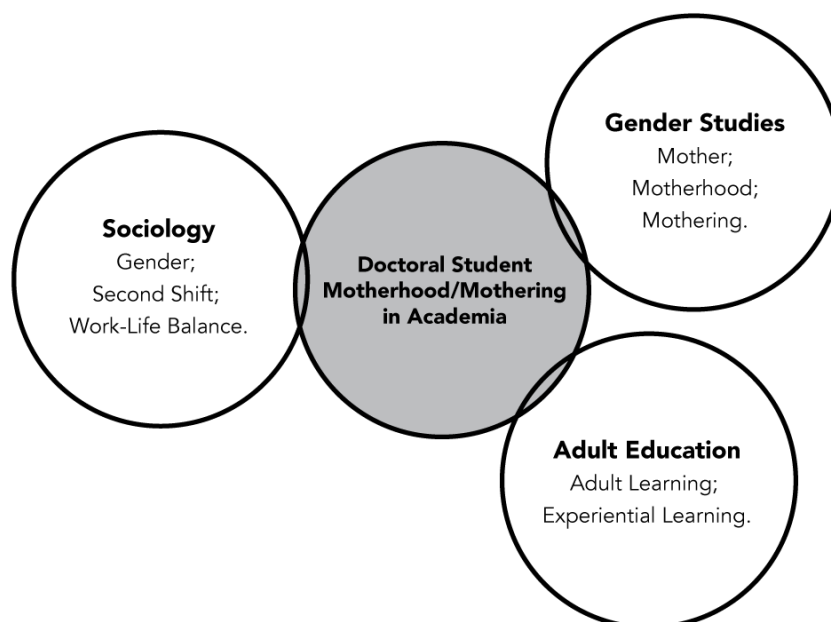Figure 11. Example of Step 5 in Development of IDR Theoretical Framework

Figure 11. Identification of interdisciplinary shared language across disciplines (or sub-disciplines or fields of inquiry) and theories addressing IDR topic of doctoral student motherhood/mothering in academia.

Within the dissertation study, the IDR framework was identified for use throughout the entire study. For example, in the introduction in Chapter One, the interdisciplinary research was introduced on doctoral student motherhood/mothering in academia, including a brief discussion of the IDR theoretical framework that drew from the integration of gender studies, sociology and adult education. Furthermore, for the review of the literature, the chapter was divided into three major sections—one for each of the disciplines (or sub-disciplines or fields of inquiry) in the theoretical framework. Within each section of the literature, the broad disciplinary research was discussed, such as a description of the literature on doctoral student motherhood/mothering in academia, moving into a discussion of the specific theory utilized for the study. Within the disciplines to be integrated—gender studies, sociology, and adult education—there was then a narrowing and focused discussion of the literature drawing from the specific theories associated with each discipline. In this case, the theories included: feminist theory, Goffman's theory of face, and a situative theory of learning which "situates" learning as both a continuing process of learning affected by previous formal and informal knowledge and experiences and also as developed through the interaction with others in communities or practices (Lave & Wenger, 1991). Through these three disciplinary lenses, collectively integrated, developed an interdisciplinary theoretical research framework.

Discussed in the methodology chapter was the rationale for using the particular methodological choice—phenomenology—and also the ways in which the IDR theoretical framework influenced the study. For example, an explanation of how both an interdisciplinary theoretical framework and methodological approach was provided:

> . . . I utilized an open phenomenological attitude, set aside judgments about the phenomenon, and incorporated an interdisciplinary theoretical framework. Using the IDR theoretical framework in this study created some tension with the methodological approach of phenomenology. I resolved this tension by working to be transparent, such as through explicitly stating my assumptions and the step-by-step processes I utilized in the analysis and findings. This meant that while the theories guided the study and provided additional insight, the theoretical framework did not, for instance, drive the selection of quotes for analysis. (CohenMiller, 2014, p. 45, emphasis added)

In the findings chapter, the three theoretical lenses that composed the IDR framework—feminist theory, Goffman's theory of face, and a situative theory of learning—were used as a broad way to discuss the results. Likewise in the final chapter discussing implications, the IDR framework provided a new way to consider the experiences of doctoral student mothers. These mothers' experiences were recognized as gendered, strategic, and embedded with a varied level of belonging as seen through the integrated theories of feminist theory, Goffman's theory of face, and a situative theory of learning. The developed IDR framework for the dissertation as explained above provided a structure for researching a complex topic. Throughout the development of the dissertation study, intentionality of integrated theories from various disciplines resulted in new disciplinary and interdisciplinary insights.

Critical Elements

As a result of engaging in and writing about IDR and IDR theoretical frameworks, we (CohenMiller—dissertation author and article 1st author and Pate—dissertation committee chair and article 2nd author) have identified ten critical elements for teaching, learning, and research. The following critical elements articulate the primary considerations for researchers, practitioners, or students learning about IDR and/or developing an IDR theoretical framework:

1. Intentionally examining problems and issues from multiple disciplines is critical to solving complex problems in IDR.
2. The term "discipline" in IDR is used broadly and with various connotations.
3. IDR is purposively integrative.
4. IDR often results in new disciplinary and interdisciplinary insights.
5. Understanding of theory is a prerequisite for understanding interdisciplinary theory and in creating an IDR framework.
6. If the IDR involves a team of researchers from across disciplines, then consensus should be built about the overarching theories of the project.
7. IDR theoretical frameworks provide purposeful attention to theories across disciplines for which to guide research and practice.
8. The limitations and benefits of conducting IDR and developing an IDR theoretical framework as an individual researcher or as an interdisciplinary team of researchers need to be considered. Limitations may include lack of time for IDR researchers to collaborate on conceptualization, implementation, and presentation of projects, as well as, time to share discipline knowledge; lack of IDR funding, presenting, and publishing opportunities; lack of organizational approaches and support for IDR; lack of leadership experience with facilitating IDR; and, lack of policy structures for IDR hiring, promotion, awards, merit, and resource allocation.

9. IDR with teams of researchers is complex and at times messy. For example, perceived and enacted hierarchies may require difficult conversations about the value of various disciplines in IDR.
10. Disciplines and theories within disciplines do not necessarily outweigh each other; instead each disciplinary perspective engaged in IDR has a contributing voice.

In this article, we have discussed interdisciplinary research (IDR), disciplines and theory in IDR, and IDR theoretical frameworks. In addition, we have suggested utilizing a 5-step model for constructing an IDR theoretical framework and provided an example of the model as used in a dissertation study. The resultant ten critical elements for learning about IDR and/or developing an IDR theoretical framework provide guidelines for others interested in moving beyond the narrowness of disciplinary thinking and moving into more global, critical spaces of thinking and research.

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