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Peircean Architectonics in the Discourse and Digitalization of Interdisciplinarity

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Abstract: *After the onset of the global pandemic in 2020, educators and policymakers are reimagining academe and its protocols and practices. Interdisciplinarity is often evoked as both a panacea and praxis in their blueprints and frameworks for a new academic architecture for higher education. However, advocates for interdisciplinarity are often unaware of the contradictions and tensions that scholars have long recognized between the rhetoric of interdisciplinarity and its actualization. As such, the troubled constitution of interdisciplinarity confuses its discourse and limits its agency, making it harder for educators and policymakers to advance a vision that is congruent with the increasing digitalization of teaching and learning in education. This theoretical meta-synthesis recalibrates the discourse of interdisciplinarity by illuminating its expression in Charles S. Peirce's architectonic theory. By reimagining Peircean pragmatism in the epistemological genealogy of interdisciplinarity introduced by James Welch, we can posit an alternative paradigm and discourse that educators and policymakers can use to reconceive higher education.*

Keywords: Architectonics; critical discourse studies; digital interdisciplinarity; online education

Introduction

The social and economic challenges exacerbated by the onset of the global pandemic in 2020 have ignited vigorous debate and controversy in political and academic circles around the world (Schwab and Malleret, 2020). In the wake of our increasing dependence on digital technology and online instruction due to a global pandemic, educators and policymakers contemplate the reconstitution of higher education (Govindarajan and Srivastava, 2020; Tesar, 2021). What is often overlooked in this moment of reflection is the number of blueprints and frameworks that were already available to help advocates for reform to reimagine academe and recalibrate its practices for a post-industrial age. For example, before the pandemic, Crow and Dabars (2017, 2020), Aoun (2017), and Taylor (2010) posited novel

reconceptualizations of higher education that are informed by the digitalization of education and the ingress of artificial intelligence.

Recognizing the disruptive nature of online learning in the field of higher education, these academic architects have called for fundamental changes in the organization of both knowledge and disciplines and further improvements in teaching and learning using advanced technology. As Taylor (2010, p. 21) noted, "when the organization of knowledge changes, the structure of educational institutions must be transformed". As such, a key theme that is evoked in the meditations on reform for the abovementioned authors is the need for more opportunities for interdisciplinary learning for students. For these scholars, finding an "appropriate framework for interdisciplinarity represents a key dimension" in the evolution of higher education (Crow and Dabars, 2017, p. 471).

More often than not, these authors and others associate *interdisciplinarity* and its iterations with the integration of content and concepts from multiple disciplines and *integration* with the combinative processes that enrich this synthesis and the academic experiences of students. In this context, interdisciplinarity emerges once again as a pedagogical panacea that is conflated with the idea of academic reform (Frodeman, 2014). The problem with this kind of coextensive thinking is that its promulgators are often unaware of the chasm that scholars such as Orr (2003) have identified between the rhetoric of interdisciplinarity and its operationalization in academic systems dominated by disciplinarity. In fact, Graff (2015) has argued that exaggerated and unrealistic expectations often abound in the rhetoric and ideology of interdisciplinarity. The scholarly literature below goes far in illustrating and substantiating Graff's diagnosis and its troubling implications for interdisciplinarity as an agent for academic reform.

Background of the Problem

The rhetoric used to inflate interdisciplinarity as an expedient can been attributed to the evocative ways in which it has been characterized and adulated with respect to *disciplinarity*. According to Menand (2010), the modern notion of *disciplines* in the United States of America emerges during the great transformation of higher education between 1870 and 1915. For Menand, disciplinarity describes the means by which the various domains of knowledge have been organized, reproduced, and monopolized in education through the power of specialization, regulation, and credentialing. However, interdisciplinarians tend to view the academic disciplines as impediments to an integrated curriculum, especially for undergraduate students. They also criticize disciplines as inadequate units for tackling the "vexing social problems of the day, most of which are multifaceted and require insights from diverse areas of expertise" (Jacobs, 2013, p. 5).

Menand (2010) claimed that interdisciplinarians appreciate a more combinative understanding of knowledge and disciplines. For them, knowledge is always already integrated and disciplinarity is simply an artificial way to classify and justify its value. Moreover, those who champion integrative learning often perceive disciplinarity as

monolithic and outdated while celebrating interdisciplinarity for its contemporaneity, progressivism, and capacity to solve complex problems (Newell, 2013). As a leading voice in interdisciplinary studies, Klein (1990, 2010) has assessed the various ways in which interdisciplinarity has been appropriated among scholars, practitioners, and administrators. She noted how interdisciplinarity is elaborated as a philosophy, a research methodology, and a constructivist process. In other words, the interdisciplinarian uses a variety of skills and activities to integrate and synthesize information, worldviews, techniques, and methodological tools from two or more disciplines in order to address complex phenomena (Boix Mansilla, 2010).

However, Jacobs (2013) has argued that disciplines are not going away. They are too entwined with faculty identity and prestige. More importantly, they provide an organizational structure for knowledge in academic systems mired in complexity. As a result, scholars have claimed that it is far from certain that interdisciplinarity can deliver on the promises that its advocates associate with its treatment as a panacea that bends toward democracy and the radical transfiguration of the status quo (Frodeman, 2014). As Graff (2015, p. 6) pointed out, "The cause of interdisciplinarity is simultaneously advanced and retarded by the cultural and political associations of interdisciplinarity". In popular thinking, the term *interdisciplinarity* is often used to describe a form of innovative education that integrates content and concepts from two or more disciplines. In interdisciplinary theory, this characterization tends to oversimplify the complex ways in which scholars have calibrated and legitimated different dimensions of the concept for varying agendas. Klein (2018, p. 48) reported, "Generalists treat interdisciplinarity loosely as any form of interaction or dialogue between two or more disciplines, while integrationists prioritize the concept and work toward a distinctive theory-based research process".

In clearer terms, generalists tend to value *conceptual* interdisciplinarity and integrationists tend to value *instrumental* interdisciplinarity. According to Frodeman (2014) and Klein (2021), scholars who study interdisciplinarity in the United States of America generally recognize these approaches as the more dominant philosophical frameworks for conceptualizing interdisciplinarity. To understand the differences in the orientations that scholars often associate with these frameworks, Klein (2021, p. 9) suggested that we might imagine conceptual interdisciplinarity as an epistemic approach that transcends disciplinary boundaries and raises questions about the nature of knowledge and reality. An example of conceptual interdisciplinarity in practice might include *boundary work*. Boundary work is the concept that Klein (1996, 2021) has used to describe the interactions and (re)formations that boundary crossing inspires in the production and organization of knowledge. The term further crystallizes her characterization of her socio-linguistic view of interdisciplinary integration as a form of *communicative action*. Borrowing from Jürgen Habermas, Klein (1996, 2021) argued that the various forms of *boundary crossing* or interactions across disciplines require language to condition action. In contrast, instrumental interdisciplinarity reflects a more pragmatic and methodical orientation that is geared toward problem solving. In his controversial study, Newell (2001) proposed complex systems theory as an appropriate rationale and focus for interdisciplinary practices. Complex systems are defined by elements

that interconnect through nonlinear relations. According to Newell (2001, p. 16), "Each step in the interdisciplinary process should have some analog in complex systems theory". To substantiate this point, Newell identified the method and steps that he says characterize the interdisciplinary process that we can use for teaching, learning, and research. They are defining, determining, developing and gathering, searching, generating, integrating disciplinary insights, identifying and evaluating, resolving and constructing, creating, producing, and testing.

These different approaches to interdisciplinarity condition its operationalization and its associated discourses. Foucault (1981, 2010) employed the term *discourse* to signify the ideas and patterns of power or authority that influence communication practices and contour the ways that we experience reality and knowledge. According to Foucault, discursive practices are guided by the construction of rules that condition and produce various forms of knowledge, particularly in education. They also produce competing interpretations of reality that inform systems of exclusion through the exercise of *disciplinarity* or the use of power to coerce and control. To respond to the interpellating power of discourse, Foucault (1981, p. 67) has insisted that "discourses must be treated as discontinuous practices, which cross each other, are sometimes juxtaposed with one another, but can just as well exclude or be unaware of each other". In a more abstract sense, scholars such as Fairclough (2014) have argued that discourse should be treated as a form of semiosis. Like Foucault, Fairclough imagined the relationship between discourse and power as the basis for action and the transformation of the disciplines in education and the status quo in society. Foucault (2010) and Fairclough (2005) use discourse to study and revalue the conceptualization of interdisciplinarity that instrumentalists advocate. For many interdisciplinarians, the instrumental approach is seen as a tool for solving complex problems, particularly in the area of research. What is paradoxical is that interdisciplinarians who support conceptual interdisciplinarity challenge the scientific and methodical orientation that instrumentalists privilege (Klein, 2017; Lattuca, 2001).

Ultimately, these competing considerations of interdisciplinarity explain why Graff (2015) has argued that interdisciplinarity is often misunderstood in higher education. Our different ideas about interdisciplinarity and its related practices hinder rather than advance transformative change in academe. Most faculty, academic administrators, and policymakers are completely unaware of what distinguishes interdisciplinarity and its iterations. For example, interdisciplinarity is typically used to refer to the integration of two or more disciplines. In contrast, multidisciplinarity describes the side-by-side juxtaposition of different disciplines. Transdisciplinarity refers to the "coordination of knowledge production with parties" beyond higher education (Frodeman, 2014, p. 3). Moreover, scholars such as Fairclough (2005) appreciate transdisdisciplinarity as a form of dialogue between disciplines and paradigms that can initiate a transformation of political and economic structures and realities in society. In some respects, Fairclough's appreciation of transdisciplinarity as inherently dialogic advances our understanding of interdisciplinarity as a semiotic enterprise (discussed below).

However, as the various labels for the multiple forms of interdisciplinarity expand, they tend to leave many of us further behind (Nissani, 1997; Jacobs, 2013). As a result, advocates for academic reform are often ill-equipped to clarify or *calibrate* their interpretations of interdisciplinarity for their practices, projects, and acclamations of it as an agentic instrument. Also, studies indicate that an educator's inability to contextualize and appropriate interdisciplinarity often results in the reproduction of the problems that *they* had hoped the concept would resolve or reform (Lattuca, 2001; Jacobs, 2013). This paradox perpetuates *failed reform* in the name of interdisciplinarity and reinforces the grip of disciplinarity on the academic imaginations of faculty and students in higher education. Not only does this contradiction maintain the status quo in academe, but it also substantiates the accusation among critics that instrumental interdisciplinarity mimics and reproduces disciplinarity (Frodeman, 2014; Jacobs, 2013). The tension that this claim excites has led noted interdisciplinarians such as Klein (2001, 2017) to acknowledge that there is a gap or *fault line* that separates conceptual and instrumental interdisciplinarity and its consequences warrant further epistemological inquiry.

If we accept Klein's assessment as a *hypothetical imperative* or end goal, then we must also question the role that interdisciplinarity has been assigned as a discourse and agent in the blueprints and frameworks supplied by academic architects such as Crow and Dabars (2017, 2020), Aoun (2017), and Taylor (2010). The philosophical schizophrenia that characterizes interdisciplinarity as a concept and practice also troubles its treatment as a panacea and praxis in a post-pandemic academy. Without a deep dive into what Butler (2008) has called the *whys* and *hows* of the approaches and discourses associated with interdisciplinarity, we are likely to continue to construct blueprints and frameworks that lead to failure rather than reform (Jacobs, 2013; Orr, 2003). With this understanding in mind, we need a supplementary paradigm that inspires the kind of transformative changes that will help us to reimagine and rebuild academic institutions for a better post-pandemic academy. To realize this goal, we must identify and advance an alternative philosophy of interdisciplinarity and a discourse that signifies its governing logic.

Purpose Statement

The purpose of this discussion is to explain why *architectonics* offers us a powerful worldview for reconceptualizing interdisciplinarity and its competing discourses in higher education. As a theory of the systematic and constructivist nature of all relations, *architectonics* is a master trope in Western philosophy. In clearer terms, it serves as a metaphor for the science of interrelations at the core of all creation and meaning-making. As such, it caters to many agendas (Holquist, 1990). For Manchester (2003, p. 188), architectonics is also "a technical term in philosophy with an interesting history, one with philological anomalies, historical vicissitudes, and philosophical pretensions". What is even more significant is that she advances the view that the concept is inherently interdisciplinary. Its cosmopolitan disposition has welcomed its use in metaphysics, education, jurisprudence, architecture, literature, ethics, and the philosophy of life itself. In the Western philosophical tradition, meditations on the nature and significance of architectonics can be found in the

work of Aristotle and further developed in the work of philosophers such as Gottfried Leibniz, Johann Lambert, Alexander Baumgarten, and Christian Wolff (Manchester, 2003). The concept has also been appropriated by more contemporary theorists such as Charles S. Peirce, Mikhail Bakhtin, Richard McKeon, and Michel Foucault (Boje, 2008). However, Manchester (2003) noted that the term is generally associated with the philosopher Immanuel Kant.

In *Critique of Pure Reason*, Kant (2007) described architectonics as the art of constructing systems, particularly systems of knowledge that have been transformed to *the rank of science by reason.* Reason censors, regulates, and orders the workings of cognition. According to Kant, the mind is divided into three higher and several lower faculties or *categories*. He indicated that the organization of knowledge and the disciplines must follow the same cognitive blueprint. As such, Kant's (1979) rationalist logic divides the faculty and disciplines into three higher ranks (theology, law, and medicine) and one larger lower rank (the philosophy faculty or those who teach what are now called the human, social, and natural sciences). The faculty in the higher ranks are regarded as the vanguard. They attend to the eternal well-being, civil well-being, and physical well-being of the general public in order to ensure a functioning society and reliable labor force. In essence, Kant's architectonic understanding of cognition mirrors his architectonic understanding of the organization of knowledge, disciplines, and faculty in higher education. This coevolution is the signifying feature in Kant's reform plan for higher education in the industrial age, and it has maintained its ideological imprint on academic institutions in the West for over two hundred years. According to Taylor (2010), the ghost of Kant still haunts today's colleges and universities.

Later philosophers such as Charles S. Peirce challenged Kant's appropriation of architectonics by reimagining it as a dialogic process (Holquist, 1990; Short, 2007). As a metaphor for interdisciplinarity, Peircean architectonics as the science of observation and (re)construction will be central to this discussion. However, its contributions to interdisciplinary theory and education remain both foreign and underappreciated among scholars in discourse theory and interdisciplinary studies (discussed below). In his study of the philosophical origins of modern higher education, Derrida (2004) acknowledged that we cannot seriously contemplate the idea of academic reform without engaging the legacy and logic of architectonics and recognizing its double duty as a praxis in philosophy and a rubric for advancing higher education for the industrial age. Although Derrida reported that Kant's model and its effectuations will likely face their demise in the post-industrial age, he signaled architectonics as the kind of conceptual tool that we can use to learn from the past in the present. Arguably, the undervaluing of architectonics as a historical and philosophical perspective might be considered "one of the most important factors blocking reforms that are so desperately needed" in higher education (Taylor, 2010, p. 49). As a result, faculty, administrators, and policymakers often develop their blueprints and frameworks for academic reform without the historical and philosophical backdrops that these plans often require. What is even more ironic and concerning is that critics suggest that most interdisciplinarians are ill-suited to provide their advocates with the kind of contextualization and supporting

discourse that they need to supplement their enthusiasm for interdisciplinarity (Graff, 2015; Jacobs, 2013; Orr, 2003).

Methodology

To illustrate this point, I will first introduce the precepts of *supplementation* using a conceptual framework inspired by Derrida (1997). His worldview will then be used to analyze the gap between architectonics as a master trope in philosophy and its absence in the genealogy completed by James Welch entitled "The Emergence of Interdisciplinarity from Epistemological Thought." In this rare and important philosophical appraisal for novice and seasoned interdisciplinarians, Welch (2011, p. 35) argued that "the interdisciplinary idea has genealogical roots in the continuum of Western thought, and offers potential solutions for the paradoxes to which it arrived". These paradoxes help to explain the divide between conceptual and instrumental interdisciplinarity and their governing philosophical discourses. For Welch, understanding these discourses is essential in establishing interdisciplinary theory as an emergent epistemological innovation. But is Welch's genealogy complete? Does it omit a key appreciation of interdisciplinarity in the discourse of Western philosophy?

To respond to these inquiries, I intend to use Derridean supplementation as a critical lens to examine the constitution of Welch's genealogy. In doing so, I will reveal how architectonics and its elaboration by Peirce are not realized in Welch's study. More importantly, I explain why this omission leads to a miscasting of Peirce and the significant role that his ideas contribute to the discourse in interdisciplinary theory and (online) education. When Peircean architectonics is (re)introduced, it acts as the *supplement* that enriches Welch's study and advances our understanding of the history of interdisciplinary theory and the dialogic continuum on which instrumental and conceptual interdisciplinarity coexist. In closing, I call for the (re)inauguration of architectonics as a potential paradigm and discourse for theorizing the post-pandemic academy.

Conceptual Framework

In *Of Grammatology*, Derrida (1997) outlined his theory of supplementation. As a framework for explication and analysis, it is important to remember that the definition of *supplement* operates under twin suppositions for Derrida. He described supplement as both a *substitute* and an *addition* in the analysis of a text or other phenomena. Supplementation is just one of the many conceptual tools that Derrida invented to respond to the influence of rationalism in the construction of knowledge and truth in the history of Western thought or *logocentrism*. The historical significance of a logocentric view of the world is that it has inspired many Western philosophers, intellectuals, and educators to privilege the metaphysics of presence over absence and speech over writing. Derrida (1978) insisted that the history of metaphysics in Western philosophy helps to sustain these configurations. Consequently, such features have caused us to rationalize the world in terms of differences, oppositions, and hierarchies. We use these structures to control or *center* meaning, and we also use them to marginalize alternative interpretations. However, the signification that Derrida associates with writing and

texts makes alternative realizations a constant danger that can trouble the borders of all structures that thwart the play of meaning or *heterogeneity*. In turn, the excess of meaning always has the capacity to excite the kind of disruptions or *deconstruction*s that challenge the status quo.

Derrida (1978) posited *deconstruction* as a praxis for disrupting all structures that categorize and classify meaning as a way to limit its diversity and play. For him, deconstruction allows us to insert alternative centers or *supplements* into dominate configurations of reality so that we can realize new meanings and possibilities that have been overlooked, hidden, or subjugated. It is the liberatory impulse inherent in the process of (de)construction that disrupts the epistemological and disciplinary obstacles that reproduce the status quo in education and elsewhere. As a form of critical reading, deconstruction values the simultaneity of differences that Derrida associated with discourse and texts. He reported, "in the absence of a center or origin, everything became discourse—provided we can agree on this word—that is to say, a system in which the central signified, the original or transcendental signified, is never absolutely present outside a system of differences" (1978, p. 280).

Ultimately, supplementation informs Derrida's (1997) understanding of knowledge as a synonym for writing and texts. He described *supplementarity* as an indefinite process that mirrors that of the *sign* in semiotics. As units of writing, texts constitute and condition all phenomena as they move from one signifying moment to the next. In other words, texts are always supplemented by other texts, which marks their interconnected nature. Derrida has argued that there is nothing outside the text because everything is a text and all texts are always interrelated or intertextual (also see Bakhtin, 1981, and Kristeva, 1986). This idea is a matter of contention in some scholarly circles. However, what Derrida (1997) seemed to suggest is that once one recognizes language as the play of signs and differences, then everything assumes the kind of contingency and heterogeneity that he associates with the nature of writing and texts. For Derrida, it is through texts that knowledge is communicated in order to achieve whatever is determined to be objective and true and vice versa (Norris, 1987). Therefore, in Derridean thought, our general definition of knowledge is stretched in a new direction. Knowledge describes the understandings and information that we acquire through education and experience. However, it also represents a system of signs and the endless supplementarity that Derrida (1997, pp. 48-49) promulgated as a property of texts elaborated by philosophers such as Peirce.

If knowledge is conditioned by texts, as Derrida and Peirce suggest, then texts might be fundamental to the expression of disciplines, interdisciplines, and every kind of scientific and critical tradition (Farris, 2017; Norris, 1987). As such, our knowledge is the process and product of writing and texts. Derrida's theory of supplementation simply heightens our awareness of the role that these elements play in underwriting the Western philosophical tradition and its discourse. More importantly, it also signals the blind spots that develop when this support system is underplayed or ignored by scholars and practitioners who appropriate this tradition to explain interdisciplinarity (Orr, 2003). Welch's exploration of the

epistemological roots of interdisciplinarity reveals how this concern has manifested in interdisciplinary studies.

Interdisciplinarity in Epistemological Thought

In "The Emergence of Interdisciplinarity from Epistemological Thought," Welch (2011) described interdisciplinarity as a response to the reductive thinking that informs disciplinarity. In this sense, interdisciplinarity strives to be a new way of knowing or what Welch called a *philosophical innovation.* More significantly, the author claimed that interdisciplinarity is also a strategy for integrating disciplines in order to transform knowledge and address complex problems. Welch (2011, p. 3) claimed that "the interdisciplinarian simultaneously utilizes, disrupts, and transcends epistemological structures in order to progressively form new holistic understandings of complex problems". Welch (2018) has advanced this particular consideration of interdisciplinarity. He even indicated that the need for appreciating interdisciplinarity as a form of complex theory is greater than ever because it helps us to make sense of the political, economic, and technological challenges that we face in the twenty-first century. However, Welch concluded that we must turn to the past in order to deepen our understanding of interdisciplinarity as an emerging innovation and worldview.

Welch's study of the emergence of interdisciplinarity in the history of Western thought is his attempt to lay the groundwork for a more comprehensive philosophical genealogy for interdisciplinarity. He claimed that the philosophical traditions that orient epistemological thought provide a context for exploring how the idea of interdisciplinarity manifests over time For Welch (2009), *epistemology* is a term that is generally used to describe the branch of philosophy that examines the nature of knowledge. It is not only one of the key ways in which disciplines legislate truth, but it also defines how they frame knowledge and reality. Furthermore, Welch (2011) argued that locating the *interdisciplinary idea* within the Western philosophical tradition could help to resolve the paradoxes found in the various conceptualizations of interdisciplinarity. He made this assertion based on the notion that the major schools of thought in this tradition are not mutually exclusive. Moreover, Welch indicated that illuminating the continuum between them is an important step toward understanding interdisciplinarity as an emergent epistemological innovation. In his assessment of the Western philosophical tradition, Welch (2011) determined that conceptual interdisciplinarity corresponds to the *postmodern* school of thought. Postmodernism unsettles the general suppositions of reductionism and refuses to accept the employment of boundaries, binaries, and hierarchies to define truth and meaning. However, Welch (2011) pointed out that postmodernism and conceptual interdisciplinarity cannot be the only basis for understanding interdisciplinary theory. It needs the pragmatism that is inherent in instrumental interdisciplinarity, particularly for solving complex problems. For him, instrumental interdisciplinarity corresponds to the *pragmatic* school of thought. Pragmatism evaluates truth and meaning based on their practical application in various situations. Welch (2011, p. 18) claimed, "In order to understand and attempt to solve complex problems, instrumental interdisciplinarity affirms that truth abides within the dynamics of complexity".

As a result, Welch went on to argue that complexity is the cornerstone of interdisciplinary theory as a pragmatic enterprise. As a theoretical approach for interdisciplinarity, complex systems theory recognizes that knowledge is open-ended, socially constructed, and contingent. As such, interdisciplinary integration is fundamentally pluralist, multifaceted, and dynamic. These are the elements that Welch (2011) associated with instrumental interdisciplinarity and pragmatism, even though these same adjectives could be used to describe conceptual interdisciplinarity and postmodernism. Nonetheless, methodology is what really distinguishes instrumental interdisciplinarity for Welch. In its instrumental mode, interdisciplinarity provides the kind of practical approach that helps one to evaluate and solve complex problems in ways that advance social and academic progress. The instrumental approach that Welch valued is introduced by Newell (2001, 2013) in a series of steps. As noted above, the steps in Newell's interdisciplinary process for teaching, learning, and research are defining, determining, developing and gathering, searching, generating, integrating disciplinary insights, identifying and evaluating, resolving and constructing, creating, producing, and testing.

Situating Peirce in Interdisciplinary Studies

Based on the adaptability of Newell's steps for teaching, learning, and research, Welch (2011, 2018) suggested that the sensibility that best supports interdisciplinarity as a theory of complexity grows out of empiricism and accords with the pragmatic view of epistemology developed by philosophers such as Peirce. As one of the progenitors of pragmatism (later renamed *pragmaticism*), Peirce viewed epistemological inquiry as a struggle toward the settlement of opinion through logical reasoning. Welch argued that Peirce's social approach to epistemology set the stage for interdisciplinarity by valuing collaboration and the interchange of perspectives among diverse constituents. In Welch's estimate, Peirce interprets the human impulse for practicality as a pathway for discovering useful principles that reveal how collaborative exchanges can resolve complex disputes and other phenomena that arise out of social interrelations. He also noted that Peirce challenged the idea that epistemological systems informed by Western reason are static. In Peircean thought, knowledge is never entirely stable or closed. Welch (2011, p. 24) stated that Peirce turned "to science to expose defective reasoning so that we might further refine our comprehension of the logic of the phenomenal world".

According to Welch, Peirce is also concerned with how the pluralism associated with interacting discourses can clarify themselves through struggle, collaboration, and consensus. He imagined Peirce as treating knowledge as a continuous process of exchange that orients toward a more holistic view of complex problems and potential solutions. Welch (2011, p. 26) wrote, "Peirce's communal approach to epistemology set the stage for interdisciplinarity by valuing exchange of ideas among diverse specialists". With this in mind, Welch (2011, 2018) indicated that pragmatism evokes a sense of epistemological balance between rationalism and postmodernism, which makes it a logical epistemological rationale for instrumental interdisciplinarity and its correlating methodology as expressed by Newell. For

Welch, the integrative processes that drive interdisciplinary activities should be grounded in pragmatism. The theoretical value that he found in pragmatism explains why he suggested that it marks the emergence of the contemporary conceptualization of instrumental interdisciplinarity. Because pragmatism requires one to sort and synthesize knowledge in a logical fashion, Welch (2011) argued that it is consistent with the aspirations of instrumental interdisciplinarity, which emphasizes the methodological integration of disciplinary perspectives in order to solve complex problems inside and outside the academy.

In his assessment of interdisciplinarity in higher education, Graff (2015) raised concerns about the preoccupation with problems and problem solving among interdisciplinarians. In Graff's work, we learn that problems have a life cycle and the emphasis on problem-oriented empirical work may fail to sustain interdisciplinary theory or collaborations in the manner that Welch imagined. In fact, Graff has argued that there is no single model or path to the development of interdisciplinarity. This diversity might explain why Carp (2001) suggested that we supplement the use of the term *interdisciplinarity* with the term *integrative praxes*. Carp described integrative praxes as the processes and practices that are fundamental to the formation of knowledge. The character of integrative praxes reflects an insight that Klein (1990) first made about interdisciplinarity in one of her earliest studies. She argued that "interdisciplinarity is an architectonic, productive process, something constructed rather than given" (1990, p. 84).

Klein's claim signals the limitations in Welch's casting of Peirce to advance instrumental interdisciplinarity at the expense of conceptual interdisciplinarity. Based on his study of Peirce's philosophy, Short (2007) would probably describe Welch's interpretation of Peirce as incomplete because it omits the dialogic features that underpin the complex philosophical system that Peirce used to distinguish his understanding of pragmatism. For example, in Welch's (2011) appropriation of Peirce, we find that there is an underappreciation of Peirce's contributions to the architectonics of language, knowledge, and (inter)disciplines. Also, there is no elaboration of the critical role that Peirce's theory of signs plays in the logic of pragmatism and *logical machines* or early computer technology. Consequently, Welch's profile of Peirce is at odds with the portrait created by scholars such as Parker (1998), Chandler (2002), Garnar (2006), and Gazoni (2016). These authors characterize Peirce as an interdisciplinary theorist whose theory of signs foreshadows the discursive innovations of thinkers such as Bakhtin, Derrida, Kristeva, Barthes, Halliday, Foucault, Fairclough, Klein, and Ted Nelson (also see Dennis, 2020b, and Orr, 2003). For example, Derrida (1997) specifically noted that Peirce's theory of the arbitrariness and irreducibility of the sign illuminates the idea that all thinking is dialogic and we are always negotiating a system of signs when communicating. He reported, "Peirce goes very far in the direction that I have called the de-construction of the transcendental signified, which, at one time or another, would place a reassuring end to the reference from sign to sign" (1997, p. 49). Ironically, this is not the understanding of Peirce that readers find in Welch's genealogy. To elaborate Peirce's important contributions to the discourse and theory of interdisciplinarity in this tradition, we must (re)introduce the key features in his architectonics that will help us to transform our articulations of interdisciplinarity in the digital age.

Peircean Architectonics as Supplement

Throughout his writings, Peirce (1955) advocated the use of philosophy as a tool for contemplating the interrelationship among creativity, connections, and actions. He did this by standing on the shoulders of his intellectual forefather, Immanuel Kant. According to Kant (2007), there are two domains of knowledge that form judgments. He claimed that thoughts represent the integration of sensibility (empiricism) and understanding (rationalism). Kant determined that the arrangement of philosophical doctrine has much in common with architecture. For Kant (2007), the formation of such doctrine is a constructive or *architectonic* process. As mentioned earlier, Kant described architectonics as the art of system. He also signaled it as a tool for teaching and learning. It is Kant who inspires Peirce's interest in architectonics and the systematization of knowledge. Peirce (1955, p. 316) stated, "that systems ought to be constructed architectonically has been preached since Kant, but I do not think the full import of the maxim has by any means been apprehended". However, Peirce (1955) recognized that knowledge changes rapidly, so his architectonics accounts for the performative nature of knowledge while also providing it with some kind of structure for observation and continuity. In other words, architectonics is central to Peirce's philosophy because it is his attempt to explain the various ways in which language and the sciences or disciplines allow us to discover and understand phenomena (Short, 2007).

According to Peirce (1955), perceptual judgments or thoughts involve particular properties or qualities. One's thoughts can be explained in terms of *Firstness, Secondness,* and *Thirdness*. He wrote, "We find the ideas of first, second, third, constant ingredients of our knowledge" (1955, p. 93). Though arranged hierarchically, the qualities associated with one category inform another, thus conditioning the different ways that we perceive reality. For example, firstness characterizes a quality in itself that is without a relation to anything else. Firstness is what Peirce called a *relate* or monadic relation. However, secondness is the term that he used to describe a *correlation* or dyadic relation. In this particular category, the quality is one of contrast and comparison. When two objects are compared, it is usually because one's perception of one thing (firstness) is seen in relation to another (secondness). The interaction between objects is one of tension and conflict. Peirce (1955) claimed that secondness is the instance where one thing acts upon another and it presupposes the idea of a purpose. When a person does anything, it is a result of the force and reaction between objects. Action is a *power struggle*. As such, effort and resistance are two sides of the same dynamic.

Peirce (1955, p. 89) wrote, "By struggle I must explain that I mean mutual action between two things regardless of any sort of third or medium, and in particular regardless of any law of action". He went on to report that ideas always involve struggle. Not only does this condition the words that one uses to express reality, but it also influences one's consciousness and conduct. In essence, this relationship informs the words that one uses to express reality and all related behaviors. In thirdness, the tension and conflict that readers find in secondness are integrated and synthesized. This is achieved when parts are united into a whole and conflicts resolve. This integrative process is the most significant quality in

Peirce's third category. Thirdness expresses the *synechism* or continuity that results from the process of combination. It also expresses the constructivism or *consciousness of learning* that Peirce claimed that one experiences after the integration of the qualities of firstness and secondness.

In articulating the qualities of firstness, secondness, and thirdness, Peirce (1955) also established the context that informs his classification of the sciences or disciplines and their interdisciplinary qualities. For instance, in Peirce's architectonic ordering of knowledge, the disciplines follow the same triadic logic of firstness, secondness, and thirdness that readers find throughout much of his philosophical work. The disciplines of discovery are first. Second are the disciplines of review. The human and practical sciences are third. According to Parker (1998), Peircean architectonics articulates the interdependence among the various sciences. He pointed out that the discipline of discovery also has three interrelated subcategories. They are mathematics, philosophy, and *idioscopy* or what we know as the physical and human sciences. Mathematics is first among the disciplines of discovery because it provides us with concepts that are indispensable to all of the other sciences. Also, the idea of continuity has its grounding in mathematics. For Peirce, mathematical reasoning is inherently integrative. In simpler terms, one might imagine mathematics as the algebra of all relations and the starting point for understanding the interdisciplinary nature of all of the disciplines in Peirce's typology. Philosophy derives its principles from mathematics and, in turn, conditions our understanding of the origins and connections between the physical and human sciences. However, Peirce (1955) also stipulated three interrelated subcategories of philosophy. They are phenomenology, metaphysics, and the normative sciences. The normative sciences consist of aesthetics, metaphysics, ethics, and logic (for a more comprehensive review of Peirce's complex classification system, see Parker, 1998, and Short, 2007).

Revaluing Peircean Discourse

In Peirce's architectonics, logic emerges as an indispensable element that helps us to (re)imagine how language acts as the agent that interconnects all disciplines and their correlating practices. It orients humans toward the end of thought or action. Unlike many philosophers of his time, Peirce (1887, 1955) considered the relationship between the thinking of humans and the thinking that machines can perform. In his pioneering study of the reasoning potential in *logical machines*, Peirce (1887) contemplated the role that machines might play in illuminating our understanding of logic and learning. He recognized that logic could be animated by humans as well as machines. More significantly, Peirce also considered logic to be another name for *semeiotics*, also called *semiotics*. As a theory of sign systems, semiotics is a way of reasoning and understanding the relational and dialogic nature of all experiences, texts, and actions. In one of his formulations of the sign, Peirce reported that a sign consists of *representamen* (form of the sign), *object* (that to which the sign refers), and *interpretant* (sense made of the sign). He claimed that we think in terms of the integration of signs or *semiosis*. Peirce (1955, pp. 99-100) stated, "A *Sign*, or *Representamen*, is a First which stands in such a genuine triadic relation to a Second, called its *Object*, as to

be capable of determining a Third, called its *Interpretant*, to assume the same triadic relation to its Object in which it stands itself to the same Object". Peirce also argued that it is through purposeful action that we construct signs. Signs are central to concept formation and discourse formation or what we call *texts*. This is the governing logic that Peirce used to underwrite pragmatism. This is also the same thinking that informs Klein's (1996, 2005) and Moran's (2010) assessment of interdisciplinarity as a form of rhetoric.

To illustrate this point, we can turn to the work of Chandler (2002) and Halliday (1978). These authors have suggested that textual relations are semiotic, dialogic, and inherently rhetorical. In their assessment of the semiology of texts, the term *rhetoric* characterizes the techniques and strategies that one employs to actualize communication and social interaction through the use of language as our primary sign system for speaking and writing. In elaborating her socio-linguistic model for interdisciplinary integration, Klein (1996, p. 69) claimed, "rhetoric thus exemplifies the complex boundary work of interdisciplinary fields". Also, she has maintained that discourse and texts function as boundary concepts that cut across all disciplines, thus highlighting the architectonic nature of interdisciplinary teaching and learning. Discourse and texts make interdisciplinary work possible, as they place a greater onus on collaboration and networking activities that include electronic communication. For Klein (1996, p. 217), these factors make communicative competence essential for interdisciplinary studies. As such, it is inextricably tied to the problems of language. In many ways, language is "inseparable from the meaning, hierarchies, relationships, locations and organization of disciplinarity and interdisciplinarity" (Graff, 2015, p. 53). This appreciation of the role of language and communication in interdisciplinary studies is underscored and advanced by Moran (2010). He reported, "Within the broadest possible sense of the term, I take interdisciplinarity to mean any form of dialogue or interaction between two or more disciplines: the level, type, purpose and effect of this interaction remain to be examined" (2010, p. 14). For Moran, interdisciplinarity is nearly impossible to practice without the integrative power of texts, which Barthes (1989) characterized as a continuous form of production (also see Fairclough, 1992, 2005).

In his assessment of the interrelation of texts, Barthes (1989) associated texts with processes of exchange and transformation. He argued that texts do not stop because the process of language knows no cessation and meaning is always becoming. Texts are constituted by overlappings and pluralities that make them interactive and indeterminate. As a complex network of relations, texts cannot be limited by hierarchies, genres, or disciplines. They are inherently integrative, intertextual, and interdisciplinary (also see Kristeva, 1986). According to Barthes (1989), interdisciplinarity begins when the disciplines reconfigure and a new object is allowed to emerge. He claimed, "In order to do interdisciplinary work, it is not enough to take a 'subject' (a theme) and to arrange two or three sciences around it. Interdisciplinary study consists in creating a new object, which belongs to no one. The Text is, I believe, one such object" (1986, p. 72). In his assessment, Landow (2006, p. 2) argued that Barthes posited a conceptualization of texts that precisely matches computer hypertext. To clarify the significance of his insight, Landow (2006, p. 55) stated, "Hypertext, which is a

fundamentally intertextual system, has the capacity to emphasize intertextuality in a way that page-bound text in books cannot."

Inspired by the work of Bush (1947) and coined by Nelson (1987), *hypertext* is the term that we use to describe the non-sequential and multidimensional blocks of texts that are linked electronically by multiple networks and nodes that offer us different pathways and connections to information. Hypertext, according to Nelson (1987), is essentially a form of (electronic) writing that is performative, interactive, and best presented on a computer screen. Nelson's conceptualization of writing is broad and interdisciplinary. For him, the term *literature* appears to represent a system of interconnected texts that included humanistic, scientific, and technical writings on any subject (Bolter, 2001). By bringing knowledge into communication through computer technology and interdisciplinarity, Nelson (1987) reintroduced the inherently architectonic nature of all textual relations that Pierce (1887, 1955) helped to inaugurate through his writings on semiotics and logical machines nearly one hundred years earlier. The groundwork that Peirce established for scholars such as Nelson is often underexplored. However, Kimaid (2015) indicated that the semiotic contributions of Peirce help to illuminate the hypertextual nature of all human communication. In one example in his study, Peirce (1887) indicated that every machine is a reasoning machine in the sense that it expresses the intersection of heterogeneous relations. Both Nelson and Peirce seemed to recognize that the process of semiosis is embedded in computer technology and its supporting infrastructure. In many respects, the computer is a machine designed to create and manipulate a system of signs that can be mathematical, verbal, or pictorial (Bolter, 2001). In her assessment of Nelson's theory of *hypertextuality,* Orr (2003, p. 50) reported that "hypertext merely develops the status of 'text' that is intertextuality's motor through digitalization".

Digitalization is the process of transferring digital data through computerized machinery and devices. In this sense, *hypertextuality* is a dialogic technology reimagined for a post-industrial world that now rationalizes itself through computers and the vast opportunities for interconnectedness and transformation that they allow (Landow, 2006; Lemke, 2003; Nelson, 1987). As such, Landow (2003) and Roderick (2016) might agree that hypertext is also a thought-form that can serve as a paradigm for inspiring institutional innovation and rearticulating our cultural experiences with computer technology and online education. It remediates our understanding of the organization of printed texts as well as the time and space in which teaching and learning can proliferate in the digital age. More significantly, when we employ hypertextuality as a framework, the disciplinary silos that govern academic discourses become permeable and so do the administrative structures that enshrine and reproduce them (Lanham, 1993; Lemke, 2003).

This appreciation of hypertextuality echoes the sentiments introduced earlier by Crow and Dabars (2017, 2020), Aoun (2017), and Taylor (2010). These scholars indicated a need for a new discourse and framework for interdisciplinarity that could guide the transformation of higher education in the future. Garnar (2006) and Gazoni (2016) would agree that Peircean architectonics provides us with a compelling discourse that we can present as a response. The

key features of this discourse can be outlined using the following principles. The first guiding principle is that language and dialogue create unity and simultaneity out of differences. The second principle is that all words, texts, genres, and disciplines integrate through semiotic processes. As such, intertextuality, hypertextuality, and interdisciplinarity become metaphorical equivalents as contemporary appreciations of architectonics. The third principle recognizes architectonics as the dialogic continuum on which intertextuality, hypertextuality, and interdisciplinarity serve as nodes and complementary ways to contemplate the creation and organization of knowledge in cognition and organizations. The last principle recognizes the importance of exigence, context, intertext, and hypertext in determining the proper approach and application of interdisciplinarity for studying the production and management of knowledge in education and the workplace using digital technology (Dennis, 2020a).

Conclusion

The reassessment of Peirce and architectonics introduced in this discussion hopefully advances our understanding of the historical and philosophical foundations of interdisciplinarity as a significant theory and discourse in Western thought. In reimagining pragmatism and interdisciplinarity in terms of Peircean architectonics, we discover that practical measures and action are not the central features of pragmatic thought as Welch (2011) implies. According to Peirce (1955), this monolithic understanding of the term confines the concept. He argued, "for to say that we live for the mere sake of action, as action, regardless of the thought it carries out, would be to say that there is no such thing as rational purport" (1955, p. 263). However, readers will not find this characterization of Peirce fully expressed in Welch's genealogy of interdisciplinarity in epistemological thought. To enrich Welch's important project, this study has evidenced Peircean architectonics as a supplement and novel metaphor for interdisciplinarity. Under the purview of Peircean architectonics and its associated principles, the semiotic processes that condition conceptual and instrumental interdisciplinarity share the same theoretical continuum (also see Klein, 2021). Therefore, a more agentic conceptualization of interdisciplinarity emerges, which transforms it into a multidimensional and heterogeneous conceptual tool that is permeated by dialogic interrelations that mirror the hypertextuality of digitalization in computer technology. In other words, interdisciplinarity is an architectonic or discontinuous mode of knowledge that is always constituted and contextualized by a network of unities and differences conditioned by conflicts and compromises (Foucault, 2010).

This marks an important change in the imprint in our thinking about interdisciplinarity and the role of digitalization and computer technology in discourse theory. Therefore, we can no longer afford to undervalue the significant contributions that Peirce has made in all of these areas and architectonic thought. Architectonics encapsulates and expresses the interdisciplinary impulse and principles that permeate Peirce's philosophy. Ultimately, it is a way to discover and build new meanings and academic relationships in higher education. Its historical and philosophical significance is an illuminating example of theory being employed by academic leaders, faculty, and policymakers to guide, frame, and organize knowledge in academe in the industrial age (Derrida, 2004; Taylor, 2010). In this respect,

architectonics surely has a role to play in the post-industrial, post-pandemic reconceptualization of higher education. Hopefully, it will register as a valuable paradigm that we can use to inform the way that we discuss discourse, digitalization, and interdisciplinarity in the future.

References

Aoun, J. E. (2017). *Robot-proof: Higher education in the age of artificial intelligence*. The MIT Press.

Bakhtin, M. (1981). *The dialogic imagination* (M. Holquist, Ed., M. Holquist & C. Emerson, Trans.). University of Texas Press.

Barthes, R. (1989). *The rustle of language* (R. Howard, Trans.). University of California Press.

Boix Mansilla, V. (2010). Learning to synthesize: The development of interdisciplinary understanding. In R. Frodeman, J. T. Klein, C. Mitcham, & J. B. Holbrook (Eds.), *The Oxford handbook of interdisciplinarity* (pp. 288-306). Oxford University Press.

Boje, D. M. (2008). *Storytelling organizations*. Sage.

Bolter, J. D. (2001). *Writing space: Computers, hypertext, and the remediation of print* (2nd ed.). Lawrence Erlbaum Associates.

Bush, V. (1945, July). As we may think. *Atlantic Monthly, 176*(1), 101-108. Available at https://www.theatlantic.com/magazine/archive/1945/07/as-we-may-think/303881/

Butler, J. E. (2008). Ethnic studies and interdisciplinarity. In T. Fong (Ed.), *Ethnic studies research: Approaches and perspectives* (pp. 243-256). AltaMira Press.

Carp, R. M. (2001). Integrative praxes: Learning from multiple knowledge formations. *Issues in Integrative Studies, 19*, 71-121.

Chandler, D. (2002). *Semiotics: The basics*. Routledge.

Crow, M. M., & Dabars, W. B. (2017). Interdisciplinarity and the institutional context of knowledge in the American research university. In R. Frodeman, J. T. Klein, & R. Pacheco (Eds.), *The Oxford handbook of interdisciplinarity* (2nd ed., pp. 471-484). Oxford University Press.

Crow, M. M., & Dabars, W. B. (2020). *The fifth wave: The evolution of American higher education*. The Johns Hopkins University Press.

Dennis, J. (2020a). The Kantian effect: Reconceiving the integration of knowledge in interdisciplinary theory. *Journal of Interdisciplinary Sciences, 4*(2), 1-14.

Dennis, J. (2020b). Languaging network learning: The emergence of connectivism in architectonic thought. *International Review of Research in Open and Distributed Learning, 21*(3), 304-318.

Derrida, J. (1978). *Writing and difference* (A. Bass, Trans.). The University of Chicago Press.

Derrida, J. (1997). *Of grammatology* (G. C. Spivak, Trans.). The Johns Hopkins University Press.

Derrida, J. (2004). *Eyes of the university: Right to philosophy 2* (J. Plug and others, Trans.). Stanford University Press.

Fairclough, N. (1992). Intertextuality in critical discourse analysis. *Linguistics and Education, 4*, 269-293.

Fairclough, N. (2005). Critical discourse analysis in transdisciplinary research. In R. Wodak & P. Chilton (Eds.), *A new agenda in (critical) discourse analysis: Theory, methodology and interdisciplinarity* (pp. 53-70). John Benjamins Publishing Company.

Fairclough, N. (2014). *Language and power* (3rd ed.). Routledge.

Farris, M. (2017). Disciplines and interdisciplinarity as relations-in-différance: A Derridean account of disciplinary knowledge differences. *Issues in Interdisciplinary Studies, 35*, 53-64.

Foucault, M. (1981). The order of discourse. In R. Young (Ed.), *Untying the text: A post-structuralist reader* (pp. 48-78). Routledge & Kegan Paul.

Foucault, M. (2010). *The archaeology of knowledge: And the discourse on language* (A. M. S. Sheridan, Trans.). Vintage Books.

Frodeman, R. (2014). *Sustainable knowledge: A theory of interdisciplinarity*. Palgrave Macmillan.

Garnar, A. (2006). Power, action, signs: Between Peirce and Foucault. *Transactions of the Charles S. Peirce Society: A Quarterly Journal in American Philosophy, 42*(3), 347-366.

Gazoni, R. M. (2016). Creative thinking in artificial intelligence: A Peircean account. *2016 International Conference on Computational Science and Computational Intelligence* (CSCI), Las Vegas, Nevada (pp. 537-540). Institute of Electrical and Electronics Engineers.

Govindarajan, V., & Srivastava, A. (2020, June 2). A post-pandemic strategy for U.S. higher ed. *Harvard Business Review*. https://hbr.org/2020/06/a-post-pandemic-strategy-for-u-s-higher-ed

Graff, H. J. (2015). *Undisciplining knowledge: Interdisciplinarity in the twentieth century.* The Johns Hopkins University Press.

Halliday, M. (1978). *Language as social semiotic: The social interpretation of language and meaning*. Edward Arnold.

Holquist, M. (1990). *Dialogism: Bakhtin and his world*. Routledge.

Jacobs, J. A. (2013). *In defense of disciplines: Interdisciplinarity and specialization in the research university.* The University of Chicago Press.

Kant, I. (1979). *The conflict of the faculties* (M. Gregor, Trans.). University of Nebraska Press. (Original work published 1798)

Kant, I. (2007). *Critique of pure reason* (N. K. Smith, Trans.). (Rev. ed.). Palgrave Macmillan. (Original work published 1787)

Kimaid, M. (2015). *Modernity, metatheory, and the temporal-spatial divide: From mythos to techne*. Routledge.

Klein, J. T. (1990). *Interdisciplinarity: History, theory, and practice.* Wayne State University

Press.
Klein, J. T. (1996). *Crossing boundaries: Knowledge, disciplinarities, and interdisciplinarities.* University Press of Virginia.
Klein, J. T. (2001). Interdisciplinarity and the prospect of complexity: The tests of theory. *Issues in Integrative Studies, 19*, 43-57.
Klein, J. T. (2005). Integrative learning and interdisciplinary studies. *Peer Review, 7*(4), 8-10.
Klein, J. T. (2010). *Creating interdisciplinary campus cultures: A model for strength and sustainability*. John Wiley & Sons.
Klein, J. T. (2017). A taxonomy of interdisciplinarity: The boundary work of definition. In R. Frodeman, J. T. Klein, & R. Pacheco (Eds.), *The Oxford handbook of interdisciplinarity* (2nd ed., pp. 21-34). Oxford University Press.
Klein, J. T. (2018). 'Advancing' interdisciplinary studies: The boundary work of integrating, complexifying, and professionalizing. *Issues in Interdisciplinary Studies, 36*(2), 45-67.
Klein, J. T. (2021). *Beyond interdisciplinarity: Boundary work, communication, and collaboration.* Oxford University Press.
Kristeva, J. (1986). *The Kristeva reader* (T. Moi, Ed.). Columbia University Press.
Landow, G. (2003). The paradigm is more important than the purchase: Educational innovation and hypertext theory. In G. Liestøl, A. Morrison, & T. Rasmussan (Eds.), *Digital media revisited: Theoretical and conceptual innovations in digital domains* (pp. 35-64). The MIT Press.
Landow, G. (2006). *Hypertext 3.0: Critical theory and new media in an era of globalization.* The Johns Hopkins University Press.
Lanham, R. A. (1993). *The electronic word: Democracy, technology, and the arts*. The University of Chicago Press.
Lattuca, L. R. (2001). *Creating interdisciplinarity: Interdisciplinary research and teaching among college and university faculty*. Vanderbilt University Press.
Lemke, J. L. (2003). Texts and discourses in the technologies of social organizations. In G. Weiss & R. Wodak (Eds.), *Critical discourse analysis: Theory and interdisciplinarity* (pp. 130-149). Palgrave Macmillan.
Manchester, P. (2003). Kant's conception of architectonic in its historical context. *Journal of the History of Philosophy, 41*(2), 187-207.
Menand, L. (2010). *The marketplace of ideas: Reform and resistance in the American university*. W.W. Norton.
Moran, J. (2010). *Interdisciplinarity* (2nd ed.). Routledge.
Nelson, T. H. (1987). *Computer lib/dream machine* (2nd ed.). Tempus Books/Microsoft Press.
Newell, W. H. (2001). A theory of interdisciplinary studies. *Issues in Integrative Studies, 19*, 1-25.
Newell, W. H. (2013). The state of the field: Interdisciplinary theory. *Issues in Interdisciplinary Studies, 31*, 22-43.
Nissani, M. (1997). Ten cheers for interdisciplinarity: The case for interdisciplinary knowledge and research. *Social Science Journal, 34*(2), 201-216.

Norris, C. (1987). *Derrida.* Harvard University Press.
Orr, M. (2003). *Intertextuality: Debates and contexts*. Polity.
Parker, K. A. (1998). *The continuity of Peirce's thought*. Vanderbilt University Press.
Peirce, C. S. (1887). Logical machines. *The American Journal of Psychology, 1*, 165-170.
Peirce, C. S. (1955). *Philosophical writings of Peirce* (J. Buchler, Ed.). Dover.
Roderick, I. (2016). *Critical discourse studies and technology: A multimodal approach to analysing technoculture*. Bloomsbury Academic.
Schwab, K., & Malleret, T. (2020). *Covid-19: The great reset*. Forum Publishing.
Short, T. L. (2007). *Peirce's theory of signs*. Cambridge University Press.
Taylor, M. C. (2010). *Crisis on campus: A bold plan for reforming our colleges and universities*. Alfred A. Knopf.
Tesar, M. (2021). Future studies: Reimagining our educational futures in the post-Covid-19 world. *Policy Futures in Education, 19*(1), 1-6.
Welch, J. (2009). Interdisciplinarity and the history of Western epistemology. *Issues in Integrative Studies, 27*, 35-69.
Welch, J. (2011). The emergence of interdisciplinarity from epistemological thought. *Issues in Integrative Studies, 29*, 1-39.
Welch, J. (2018). The impact of Newell's 'A theory of interdisciplinary studies': Reflection and analysis. *Issues in Interdisciplinary Studies, 36*(2), 193-211.

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