

# Just a Tool? John Dewey's Pragmatic Instrumentalism and Educational Technology

By  
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Submitted to the graduate degree program in Social & Cultural Studies in Education and the Graduate Faculty of the University of Kansas in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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**Just a Tool? John Dewey's Pragmatic Instrumentalism and Educational Technology**

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## **Abstract**

This dissertation examines how John Dewey's philosophy of knowledge might be used to consider the aims of contemporary educational technologies. While significant scholarship exists examining the historical and philosophical importance of Dewey's contributions to American progressive education, much less scholarship has focused on examining the relationship between Dewey's theory of knowledge and his thoughts regarding the purposes and aims of educational technologies. I argue that because many of Dewey's ideas were heavily influenced by the material and social changes of the industrial revolution, his theories about knowledge, technology, and education offer a unique perspective when considering the educational significance of digital technologies.

This dissertation is guided by two central questions: (1) What is the relationship between Dewey's philosophy of knowledge, his philosophy of technology, and his philosophy of education? (2) How might Dewey's ideas about the relationship between knowledge, technology, and education help educators, students, and policy makers think about the aims and uses of digital technologies in contemporary educational contexts?

I begin by examining Dewey's pragmatically instrumental account of knowledge. I then examine pragmatic instrumentalism as it relates to the field of philosophy of technology. I demonstrate that pragmatic instrumentalism is a non-deterministic yet value-laden approach to technology and represents a distinct philosophical approach to technological change. I go on to demonstrate how the relationship between Dewey's philosophy of knowledge and his philosophy of technology shaped his philosophy of education. I argue that Dewey's philosophy of education is comprised of three sets of interlocking arguments: developmental arguments, technological arguments, and instrumental arguments. I contend that Dewey argued for a pragmatically

instrumental understanding of knowledge, technology, and education in which the process of growth is shaped by the relationship between the experiences of learner, the social and technological contexts of the learning environment, and the ongoing development of intellectual habits of active inquiry.

I conclude my dissertation by applying Dewey's ideas about knowledge, technology, and education to a consideration of some contemporary educational contexts. I argue that if the aim of education is the cultivation of educative experiences that lead to growth, then a pragmatically instrumental approach to educational technology suggests that educators, students, and policy makers *accept responsibility* for the uses of ICTs by rejecting technological determinism and a narrow focus on fixed-end standards.

## **Acknowledgements**

I am extremely grateful to my wife for her support, encouragement, and patience. Writing a dissertation is a difficult process, and she has been kind and generous throughout the entire process. I am also deeply grateful for the insights, support, friendship, and guidance from my advisor, Dr. Suzanne Rice. She has been an unflinching advocate, critic, and colleague. I would also like to thank Dr. John Rury, Dr. Argun Saatcioglu, Dr. Heidi Hallman, and Dr. Joe O'Brien for their insights and support. Finally, I would like to thank my colleague and friend Dr. Sara Marten who listened patiently to my ideas and encouraged me throughout.

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## Chapter 1 Introduction

Beginning in the mid 1990s with Larry Hickman's (1992) publication of *John Dewey's Pragmatic Technology* there has been a renewed interest in John Dewey's ideas about technology. While there has long been an abundance of scholarship about how the scientific revolution, psychology, and Darwinian evolution influenced Dewey's thoughts on the instrumental nature of knowledge, much less scholarship has focused on how the rapid transformations of the industrial revolution also influenced his instrumentalist approach (Godfry-Smith, 2002; Lutz, 1985; Menand, 2001; Murphy, 1990; Philips, 1971; Rorty, 1982; Ryan, 1995; Shook, 2000; Westbrook, 1991; White, 1943). Even fewer scholars have examined in depth how Dewey's ideas about technology influenced his philosophy of education. Because Dewey is such a key theorist in the development of American education, and because contemporary educational practices are again experiencing technological changes analogous to the industrial revolution of Dewey's era, considering anew how Dewey understood the relationship between technology, knowledge, and education might suggest valuable new approaches to how we think about educational technologies in the 21<sup>st</sup> century.

Like the industrial revolution of the early 20<sup>th</sup> century in which many of the aims and institutional structures of contemporary public education were first formed, the digital revolution of the early 21<sup>st</sup> century is inviting a widespread reassessment of some of the basic structures and beliefs regarding American public schools. The assumption that schools can rely on a "two lives" strategy in which students conduct their digital lives outside of school then unplug to engage in academic life within schools is proving challenging (Ohler, 2011). Advances in online technologies are changing how students access and experience information and pushing the walls of the school far beyond the confines of a brick and mortar building.

American education has faced a similar period of technological disruption. As I discuss in greater detail in chapter four, the modern American public school system first came into being during an era of rapid technological advancement. Both organizationally and pedagogically, the industrial revolution and the Progressive Era of the late 19<sup>th</sup> and early 20<sup>th</sup> century dramatically reshaped the educational landscape in America. By creating an expansive middle class, coupled with rapid urbanization, an influx in immigration, and changes in child labor laws, the industrial revolution resulted in expanded access to higher education, a broad reorganization of the general curriculum, and the creation of the American high school (Cremin, 1961; Krug, 1964; Lagemann, 2000; Westbrook, 1992).

Pedagogically, educators of the Progressive Era openly questioned and reformed educational norms that stretched as far back as antiquity. Responding to the growing labor needs of an ever-expanding industrial world, heated debates arose over the ultimate aims of a public education. Should, as some argued, schools focus more on training students in vocational arts, or should schools continue to educate students in the belief that most will attend college? Both perspectives were argued amid and because of the changing social, material, and technological realities of the industrial revolution (Callahan, 1962; Kleibard, 1999; Labaree, 1997; Rury, 2016; Tyack & Cuban, 1995).

Tyack (1974) has famously argued that certain norms of schooling, a “grammar,” emerged out of the industrial era and have persisted to this day in guiding the organization of schooling (Tyack & Tobin, 1994). As digital technologies become more and more common, many contemporary theorists argue that this grammar is becoming increasingly antiquated. Technological enthusiasts argue that the unique nature of digital technology requires a new structure, one that is decentralized, personalized, and more expressive of the capacities of the

digital world. Technological skeptics argue that digital technologies are “shallowing” educational practices by habituating students to the consumption of contextless information and the breakup of civic community. Both positions, however, generally recognize that the digital revolution is challenging educators, students, and policy makers to confront some basic and fundamental beliefs about the nature and function of American public education (Carr, 2011; Collins & Halverson, 2009).

I would like to suggest that Dewey, and the renewed interest in his ideas about technology, might help inform this debate. Dewey is important both as a central historical figure during a formative time in American education, and he is important as a philosopher whose ideas remain relevant to contemporary discussion about knowledge and education.

It is my intent in this dissertation to show how Dewey’s thoughts on technology relate to his philosophy of knowledge and his philosophy of education. Furthermore, I will show how the relationship between Dewey’s thoughts on technology, knowledge, and education might be used to consider contemporary approaches to modern educational digital technologies. In both capacities, I hope to add new insights into Dewey’s ideas as they are relevant to the scholarly work on the Progressive Era in education, as well as new insights into how Dewey’s ideas about the relationship between knowledge, technology, and education might serve as a distinct philosophical position challenging the binary choice between technological enthusiasm and technological skepticism.

This dissertation, therefore, hopes to answer the following two questions:

1. *What is the relationship between Dewey’s philosophy of knowledge, his philosophy of technology, and his philosophy of education?*

2. *How might Dewey's ideas about the relationship between knowledge, technology, and education help educators, students, and policy makers think about the use of digital technologies in contemporary educational contexts?*

Through careful analysis of these three branches of Dewey's thinking, I ultimately argue that *as a distinct position across the fields of philosophy of knowledge, philosophy of technology, and philosophy of education, Dewey suggests that if educators, students, and policy makers desire to cultivate growth and free inquiry they must ultimately accept responsibility for the uses of educational technologies.* Accepting responsibility entails rejecting fixed educational standards and technological determinism.

### **Methodology**

This is a work of educational philosophy and as such relies heavily on the methods common to the discipline of philosophy. While there is no one clear method of philosophical analysis, a long tradition of philosophical thought suggests a general approach. According to the American Philosophical Association,

Research in philosophy also often takes the form of efforts to refine analyses, develop and advance or criticize interpretations, explore alternative perspectives and new ways of thinking, suggest and apply modified or novel modes of assessment, and, in general to promote new understanding. A special case of this type of research is conceptual and methodological critique, involving the scrutiny of the basic concepts and methodologies of other disciplines, scientific as well as humanistic. Other cases involve interpretive and evaluative inquiry contributing to the enhancement of our comprehension of ourselves and our world. All of these forms of endeavor contribute importantly to the philosophical and academic enterprise. (1996, par. 3)

Another account is provided by *The Routledge Encyclopedia of Philosophy Online* in which philosophical analysis is considered “a method of inquiry in which one seeks to assess complex systems of thought by ‘analysing’[sic] them into simpler elements whose relationships are thereby brought into focus” (Thomas, 1998, par. 1). The *Oxford Companion to Philosophy* argues that “philosophical analysis is best understood by analogy with analysis in chemistry, as being a process of investigation into the structure, functioning, and connections of a particular matter under scrutiny” (Grayling, 1995, p. 27). Dewey, himself, considered the method of philosophy to be part criticism, part interpretation:

Philosophy thus has a double task: that of criticizing existing aims with respect to the existing state of science, pointing out values which have become obsolete with the command of new resources, showing what values are merely sentimental because there are no means for their realization; and also that of interpreting the results of specialized science in their bearing on future social endeavor. (*DE*, p. 329)

The foundation of my analysis comes from a close reading of Dewey’s major works. In general, it is common for Dewey scholars to access Dewey’s major works through the thirty-seven volume *The Collected Works of John Dewey*, edited by Boydston & Hickman (1996) and published by the Southern Illinois University Press. The *Collected Works* breaks Dewey’s writings into his *Early Works* (*EW*, 1882-1898), *Middle Works* (*MW*, 1899-1924), and *Later Works* (*LW*, 1925-1953) (Sharpe, Simon & Levine, 1991). While I do at times use some of the *Collected Works* throughout this dissertation, I primarily rely on the major works as they are published individually. Throughout this dissertation I signify their use through abbreviations. I list these works and their abbreviations here in order of their original publication dates: *The School and Society* (*SS*, 1900), *The Child and the Curriculum* (*CC*, 1902), *How We Think* (*HWT*,

1910), *Schools of Tomorrow* (ST, 1915) *Democracy and Education* (DE, 1916), *Reconstruction in Philosophy* (RP, 1920), *Human Nature and Conduct* (HNC, 1922), *Experience and Nature* (EN, 1925), *The Public and its Problems* (PP, 1927), *The Quest for Certainty* (QC, 1929), *Individualism Old and New* (ION, 1930), *Art as Experience* (AE, 1934), *Liberalism and Social Action* (LSA, 1935), *Logic the Theory of Inquiry* (LTI, 1938), *Experience and Education* (EE, 1938), *Freedom and Culture* (FC, 1939), and *The Problems of Men* (PM, 1946).

When necessary I also consulted essays, magazine articles, introductions, and other ancillary writings of Dewey's. In general, consultation of these writings occurred because of references made in the secondary literature or through a cross-referenced search of a particular concept or specific terminology as provided by the *Index for the Collected Works of John Dewey* edited by Anne S. Sharpe, Harriet Furst Simon, & Barbara Levine (1991).

While these works comprise the core of my analysis, they are by no means the only works consulted. I have also relied on numerous secondary sources which are documented and discussed in detail throughout this dissertation.

### **Overview of the Chapters**

Each chapter in this dissertation is meant to serve as a methodical and systematic explanation and analysis of some of the main arguments and debates surrounding Dewey's philosophy of knowledge, his philosophy of technology, and his philosophy of education. In the final chapter I attempt to demonstrate some of the ways my analysis might be used to consider contemporary educational technologies.

In chapter two, I explain Dewey's arguments defining pragmatic instrumentalism. While much of Dewey's work in the philosophy of knowledge came late in his career, it is a topic he explored and developed over the course of decades. I argue that pragmatic instrumentalism is

Dewey's attempt to overcome deep divisions within the Western philosophic tradition stretching as far back as antiquity. I conclude by providing a specific definition of pragmatic instrumentalism and demonstrating how Dewey defended his PI against criticism.

Chapter three lays out some of the broad contours of the field of philosophy of technology. Using Mitcham's (1992) distinction between an engineering philosophy of technology (EPT) and a humanities philosophy of technology (HPT) as a starting place, I explain how Dewey's PI has been interpreted as a distinct middle ground between these two divisions. I trace Dewey's philosophy of technology through his specific understanding of the history of science and his arguments characterizing the industrial revolution as confirmation of the instrumental value of the scientific method. I conclude that PI is a distinct position within the field of philosophy of technology, one that is characterized by its non-deterministic yet value-laden orientation toward technological development.

Chapter four argues that Dewey's philosophy of knowledge and his philosophy of technology directly inform his philosophy of education vis-à-vis his ideas about education through occupations. By contextualizing Dewey within the historical debates marked by the Committee of Ten and the Cardinal Principles Committee, I argue that Dewey's education through occupations is a distinct philosophical approach to education that emphasizes scientific methodology and technological tools as critical elements for the cultivation of growth. I further argue that growth can be characterized as the cultivation of habits of active inquiry.

Chapter five explores how Dewey's PI, as the basis of his philosophy of knowledge, technology, and education might be used to consider a broad approach to contemporary digital technologies. I argue that a PI approach to information and communication technologies (ICTs) suggests that educators, students, and policy makers continually reflect on the ways digital



technologies are changing our relationship to the gathering and communication of information. I then argue that a PI approach suggests that educators, students, and policy makers accept responsibility for ICT technology by rejecting technological determinism and recognizing that ICTs also express values.

### **Limitations**

This is an interdisciplinary dissertation and as such it must walk a fine line between too narrow and too broad of a focus. Much of the literature examining Dewey's philosophy of knowledge and his philosophy of technology is generally confined to the discipline of philosophy and assumes a familiarity with the language and topics common to the fields of epistemology, philosophy of science, and philosophy of technology. I have tried to make these concepts palatable to specialists and non-specialists alike, as one of the indirect goals of this dissertation is to demonstrate how philosophical analysis remains relevant to contemporary educational concerns. By so doing, invariably, I leave myself open to criticisms that my analysis is either too granular and hence unclear, or it is too broad and in need of deeper explanation. I welcome both criticisms as an act of philosophical investigation itself. Creating a "dialogue across difference" is one of the main tasks of philosophy, and any critique that sharpens my linguistic and argumentative focus while also expanding the pool of scholars and educators engaging in the debate is, in my mind, a healthy act of philosophical discourse (Burbules & Rice, 1991, p. 393)

A word about Dewey. It is almost mandatory to mention that Dewey's language can, at times, be difficult. I liken reading Dewey to wandering through a dense forest on the edge of the plains—you eventually arrive at a wide-open space, even if you cannot always see it. Furthermore, Dewey was not prone to constructing general philosophical systems nor to

prescribing a particular course of action. Some may find this frustrating or consider it an argumentative weakness. I do not. That this dissertation does not conclude with particular policy recommendations nor specific curricular or teaching protocols is a reflection of my own pragmatic sensibility.

Finally, any dissertation that attempts to write about modern technology runs the risk of becoming irrelevant the moment it is written. Moore's (1965) law stating that computer power will double every two year has, for the most part, proven accurate. The examples I provide throughout this dissertation are invariably going to seem antiquated in a short amount of time. This is unavoidable. I hope my general conclusions about a pragmatically instrumental approach to these technologies will not prove so short lived.

## **Chapter 2 Pragmatic Instrumentalism**

The purpose of this chapter is to thoroughly explain what Dewey means by pragmatic instrumentalism (PI). There are two important prongs to Dewey's theory of pragmatic instrumentalism. The first prong is made up of a set of premises defining human experience as a fully interactive and continuous process. The second prong is a set of arguments that conceptualizes inquiry as an adaptive response to problematic situations arising out of empirical contexts.

It is important to note upfront that Dewey does not believe these two prongs occur in isolation. The actual nature of human experience and the process of inquiry are mutually interpenetrative and continually interweaving; they are not two different sets of phenomenon, just different manifestations of one organic process. While for my purposes it is important to consider the criteria of experience and the process of inquiry in isolation, I will eventually bring these arguments back together as comprising the total meaning of pragmatic instrumentalism (PI). I will ultimately argue, as does Dewey, that in all instances, be it the adaptive efficiencies of habit or the experimental processes and methods of active inquiry, our experiences determine the value of and possible solutions to the problems at hand.

To make my argument I will first explain how Dewey situates his theory of knowledge within a broader context of philosophical concerns, specifically how and why he argues against the dualistic and foundationalist traditions of Western philosophy. Second, I will explain how Dewey defines experience as one characterized by continuity and interaction. Third, I will explain Dewey's understanding of inquiry, which he sees as the purposeful adaptation between the human organism and the precariousness of empirical existence. Fourth, I will explain how and why Dewey argues that freedom and community are critical to the meaningful function of

knowledge. Fifth, I will address how Dewey countered some of the most common criticisms of PI, specifically the claims of scientific realism and critical theory.

### **The Heritage of Philosophical Fallacies**

In order to understand the arguments Dewey puts forth conceptualizing the nature of human experience and inquiry, it is important to first understand the philosophical tradition to which Dewey was responding. In order to do so I will examine the two central philosophical problems Dewey discusses across his writings and which, he argues, represent two enduring fallacies of “selective emphasis” common to the Western philosophical tradition—dualism and foundationalism (*EN*, p. 11). Dualism, broadly understood, is the “theory that mind and matter are two distinct things” (Nagel, 1995, p. 206). Foundationalism is the “theory that knowledge of the world rests on a foundation of indubitable beliefs from which further propositions can be inferred to produce a superstructure of known truths” (Jones, 1995, p. 289). In presenting these problems it is important to note that Dewey’s intent was not to condemn the past as woefully ignorant, but to illustrate why these fallacies could no longer serve the purposes of contemporary society:

It is, accordingly, relevant to the theme of needed reconstruction to say that the adverse criticisms of philosophies of the past are not directed at these systems with respect to their connection with intellectual and moral issues of their own time and place, but with respect to their relevancy in a much changed human situation. The very thing that makes the great systems objects of esteem and admiration in their own socio-cultural contexts are in large measure the very grounds that deprive them of the “actuality” in a world whose main features are different to an extent indicated by our speaking of the “scientific

revolution,” the “industrial revolution” and the “political revolution” of the last few hundred years. (*RP*, pp. iv-v)

A further caveat. This chapter examines these two fallacies only as philosophic postulates against which Dewey’s pragmatic instrumentalism is believed a response. Each one of these fallacies has a long and rich philosophic history and to attempt a thorough summary of the philosophers and contexts of each fallacy would be impractical. In subsequent chapters, however, I will examine at greater length how Dewey responds to these fallacies across his specific interpretations of science, technology, and education. The focus of this chapter is simply to explicate the argument for pragmatic instrumentalism and how Dewey conceptualized PI as a response to the fallacies of dualism and foundationalism. It is therefore only necessary to understand the postulates in this context.

### **The Fallacies of Dualism and Foundationalism**

“I cannot stress too heavily,” writes Mortin G. White (1943) in *The Origin of Dewey’s Instrumentalism*, “the concept of dualism in Dewey’s development. No position, large or small, that Dewey attacked was not charged at some point with being dualistic” (p. 150).

Throughout his entire career, Dewey argued that the conceptual divisions common to the Western philosophical tradition, such as those concerning the difference between mind and body, fact and value, theory and practice, were not substantive divisions but reflected instead an inability of philosophy to look outside itself. “Quarrels among conflicting types of philosophy are thus family quarrels. They go on within the limits of a too domestic circle, and can be settled only by venturing further afield, and out of doors” (*EN*, p. 47). This “circle,” Dewey argued, had long been dominated by attempts to define “pure” reality as either solely intellectual or solely material based on a desire to discover the foundation or “essence” of all knowledge.

Some theories ascribe the ultimate test of knowledge to impressions passively received, forced on us whether we will or no. Others ascribe the guarantee of knowledge to synthetic activity of the intellect. Idealistic theories hold that mind and object known are ultimately one; realistic doctrines reduce knowledge to awareness of what exists independently, and so on. But they all make one common assumption. They all hold that the operation of inquiry excludes any element of practical activity that enters into construction of the object known. (*QC*, p. 22)

In both cases, according to Dewey, be it from an idealist or materialist perspective, foundationalism and dualism conceptualize knowledge as an object separate from human practical experience: the foundation of knowledge is either found in the functions of the mind or in the “essences” of the material world and the objects of investigation. According to Rorty (1982),

Those who want truth to have an essence want knowledge, or rationality, or inquiry, or the relation between thought and its object, to have an essence. Further, they want to be able to use their knowledge of such essences to criticize views they take to be false, and to point to the direction of progress toward the discovery of more truths. (p. 162)

For Dewey, because philosophers had become so focused on reconciling the problems created by foundationalism and dualism, philosophy itself had turned away from considering the problems of everyday human life. Philosophy had become the search for Truth rather than an activity of human adaptation to solve the problems of living.

Modern philosophy...has tried to combine acceptance of the conclusions of scientific inquiry as to the natural world with acceptance of doctrines about the nature of mind and knowledge which originated before there was such a thing as systematic experimental

inquiry. Between the two there is an incoherent incompatibility. Hence the best efforts of philosophy have been frustrated by artificiality and by controversial conflicts. (*QC*, p. 49)

Specifically, argued Dewey, the “incompatibility” arose because of the tendency in the philosophic tradition to valorize either the theoretical idea or the material object over and above the *experiencing* of the object. By assuming that “the results of reflection as having, in and of themselves, a reality superior to that of the material of any other mode of experience” (*EN*, p. 19),

The whole classical tradition down to our day has continued to hold a slighting view of experience as such, and to hold up as the proper goal and ideal of true knowledge realities which even if they are located in empirical things cannot be known by empirical methods. (*QC*, p. 27)

The truth is, Dewey argued, most of our life is not cognitive at all. It is instead composed of experiences that are immediate and involve the human agent as an organism within and of nature. Most experiences are visceral and pre-reflective responses to environmental stimulation. These experiences, although unarticulated and precognitive, bind us to nature as *participants* in the natural process. To assert that the cognitive or material object, the one formed through inquiry, has a primary and superior reality over experience of the object, Dewey argued, is a fallacy. That is, according to Dewey, it is a wrong to assume that the *totality* of reality is singularly bound to the cognitively formed objects of rational and scientific knowledge simply because we prefer the conceptual cleanliness of the *idea* of experience over the messy and complicated *reality* of experiences.

## **The Nature of Human Experience**

According to Dewey, experience “includes *what* men do and suffer, *what* they strive for, love, believe and endure, and also *how* men act and are acted on, the ways in which they do and suffer, desire and enjoy, see, believe, imagine--in short, processes of *experiencing*” (Italics Dewey, *EN*, p. 8,). To borrow from William James, experience is a “double-barreled” word, it describes both an object and a process (James, 1904, p. 480). We can strive *for* an experience and we can *have* an experience. Experience involves the human organism in a multitude of idiosyncratic impulses, *and* it provides the sensory data of basic existence. We feel, fear, love, and grow in and through our experiences.

According to Dewey, the human organism exists in a world that fluctuates between periods of existential “stability” and “precariousness” (*QC*, p. 235). Existential stability occurs when the organism, human or otherwise, is in synch with his environment; existential precariousness whenever the organism and environment are out of balance. Dewey conceptualizes the relationship of the world and the human organism as one of endless interaction and adaptation along a wide spectrum of wants and needs. This conception, Dewey argues, stands in contrast to more classical notions of nature:

The change in the conception of nature is expressed in summary form in the idea that the universe is now conceived as open and in process while classical Greece thought of it as finite in the sense in which finite means finished, complete and perfect. (*LTI*, p. 93)

### **Continuity and Interaction**

According to Dewey, the nature of the world and the nature of the human organism is one that exists within an ever-shifting empirical landscape of other people and things. Experience is always embedded in a social and interactive context. Dewey calls this the “principle of



interaction” (*EE*, p. 44). We live among others, we share resources, we communicate, we fight and die, all in the company of other people, environments, and organic processes. We are not, ever, apart from nature.

The thing essential to bear in mind is that living as an empirical affair is not something which goes on below the skin-surface of an organism: it is always an inclusive affair involving connection, interaction of what is within the organic body and what lies outside in space and time.... (*EN*, p. 282)

These interactions occur individually and collectively, internally and externally, physically and intellectually.

Whatever else organic life is or is not, it is a process of activity that involves an environment. It is a transaction extending beyond the spatial limits of the organism. An organism does not live *in* an environment; it lives by means of an environment. (*LTI*, p. 25)

Not only does every experience exist because of and within an ecosystem of interactions, but it also exists along a continuum of development. Experience is a process whereby the past affects the present which affects the future. Experience is a growing and developmental process. It is an ever-becoming. Dewey calls this process “the continuity of experience” (*EE*, p. 35). The nature of empirical “continuity” is one in which all experience affects and modifies the conditions of all future experiences. “Every experience enacted and undergone modifies the one who acts and undergoes, while this modification affects, whether we wish it or not, the quality of subsequent experiences” (*EE*, p. 35). Unlike Aristotelian teleological thinking in which the “arc” of experience tends towards some fixed and predetermined end, however, Dewey argues that

experience is an endless process that has no end other than to continue for as long as the organism lives.

The process of living is continuous; it possesses continuity because it is an everlastingly renewed process of acting on the environment and being acted on by it together with institution of relations between what is done and what is undergone. Hence experience is necessarily cumulative and its subject matter gains expressiveness because of cumulative continuity. The world we have experienced becomes an integral part of the self that acts and is acted on in further experience. In their physical occurrence, things and events experienced pass and are gone. But something of their meaning and value is retained as an integral part of the self. (*AE*, p. 108)

The principles of interaction and continuity are mutually reinforcing “criteria of experience” (*EE*, p. 33). That is, to even have an experience or to be experiencing one must be fully embedded in a social situation that is, itself, the product of a continuous process of previous experiences and interactions. Experience, in its totality, is not a fixed point in time but a process of organic intermingling in which organisms, the environment, and the conditions created by past empirical conditions come together, temporarily, along a continuous path of development.

### **The Nature of Inquiry**

Most of the time, experience is a reasonably smooth affair. We are well adapted to our environments and act according to behaviors that have proven effective in navigating the daily business of living. We enact habits. Dewey defines a habit as “an acquired predisposition to ways or modes of response, not to particular acts except as, under special conditions, these express a way of behaving” (*HNC*, p.42). Habits are efficient behavioral adaptations that have been worked out through experience and have proven to be reliable for accomplishing tasks in a

predictable way. They are "... a form of executive skill, of efficiency in doing. A habit means an ability to use natural conditions as means to ends" (*DE*, p. 46).

Most of our lives are conducted through habits. We drive our cars, cook our meals, and take our walks in patterns that have become routine because they work across a range of situations. Habits are useful because they work. They are methods of conduct, "energy organized in certain channels" (*HNC*, p.76). Their usefulness is tied to their consequential success. Importantly, however, habits have no predetermined ends other than the successful usefulness of the habit to the situation within in which it operates. Habits are, therefore, a semi-permanent method of effective adaptation whose value is judged according to a habit's ability to secure ends, whatever those ends may be.

When, however, our habitual ways of dealing with the world break down, or we encounter precarious situations within which habitual processes are no longer successful, we enter the processes of inquiry. Dewey defines inquiry as, "the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent distinctions and relations as to convert the elements of the original situation into a unified whole" (*LTI*, p. 105). In other words, inquiry is a problem-solving process arising from specific empirical situations whereby we employ thinking to manipulate the problematic elements of a situation towards desired ends. This method, according to Dewey, is experimental and scientific. It is an *active* process of testing hypothesis against consequences to solve existential problems. What is to be investigated and what knowledge is produced is dependent on the nature and significance of the problem. "To discover the meaning of the idea ask for its consequences" (*RP*, p. 94). Dewey calls these consequences the "end-in-view." An "end-in-view" is "an aim, purpose, a prediction usable as a plan in shaping the course of events" (*EN*, p. 101).

Inquiry can arise from a large spectrum of problematic situations ranging from the very mundane needs of physical satiation to the more complex needs of group cohesion. Each situation, as a totality of continuity and interaction, gives specific context and form to a problem by bringing into observable relief the relationship between the situational problem and the social and interactive needs of our existential selves. That is, inquiry is a process that both solves and creates the problem; it is the process whereby we understand the *meaning* of a problem.

By saying inquiry “creates” a problem, Dewey is claiming that prior to engaging the process of inquiry, of thinking, specific problems do not exist. A problem is created by our awareness of a problem. We judge what is or is not problematic, and that judgement generates the problem. The empirical situations and objects exist, but they are not problematic, per-se, nor are we attentive to them other than in a non-cognitive way.

The indeterminate situation becomes problematic in the very process of being subject to inquiry. The indeterminate situation comes into existence from existential causes, just as does, say, the organic imbalance of hunger. There is nothing intellectual or cognitive in the existence of such situations, although they are the necessary condition of the cognitive operations of inquiry. In themselves they are precognitive. The first result of inquiry is that the situation is taken, adjudged to be problematic. To see that a situation requires inquiry is the initial step in inquiry. (*LTI*, p. 107)

This is not some obscure point. For Dewey, inquiry is an active choice of attention and definition. Dewey calls this activating force an “impulsion”:

I say “impulsion” rather than “impulse.” An impulse is specialized and particular; it is, even when instinctive, simply part of the mechanism involved in a more complete

adaptation with the environment. “Impulsion” designates a movement outward and forward of the whole organism to which special impulses are auxiliary. (*AE*, p. 60)

It is tempting to brush aside the specificity of this terminology as unnecessarily pedantic. In truth, it is illustrative of an important set of assumptions Dewey argues for across his writing. Dewey wanted clearly to distinguish between organic processes which are purely mechanical and unthinking from those that are purposeful and intentional. For Dewey, inquiry is more than just an adaptive response (although it is that), it is also a reflective process whereby we return to question the *conditions* of the problem by bringing to conscious attention our own role in the creation and selection of the problem. How we come to view a problem as a problem is as important to inquiry as the solution of the problem itself. Inquiry, therefore, is both a process of actively attaining desired ends *and* a conscious awareness of the how and why we seek to attain those ends.

Philosophically speaking this is the great difference involved in the change from knowledge and philosophy as contemplative to operative. The change does not mean the lowering in dignity of philosophy from a lofty plane to one of gross utilitarianism. It signifies that the prime function of philosophy is that of rationalizing the *possibilities* of experience, especially collective human experience. (*PR*, p. 70)

### **Inquiry as Deliberate and Reflective**

As a deliberative process, inquiry “is the force that stops the mindless ongoing of an impulse or habit” (*HNC*, p. 197). When a situation becomes problematic and our habitual ways for dealing with the situation no longer work, we deliberate on a course of action that will solve the problem. We become aware of possible outcomes, “ends-in-view,” and we weigh our options.

The office of deliberation is not to supply an inducement to act by figuring out where the most advantage is to be procured. It is to resolve entanglements in existing activity, restore continuity, recover harmony, utilize loose impulse and re-direct habit. (*HNC*, p. 199)

To deliberate is to focus on the means for problem-solving by hypothesizing and experimenting based on the possible ends of so doing. It is an “outlooking,” an active discovering, a purposeful attention to details of the situation and the effects certain paths of behavior might have on future consequences:

In short, the thing actually at stake in any serious deliberation is not a difference of quantity, but what kind of person one is to become, what sort of self is in the making, what kind of a world is making. (*HNC*, p. 217)

As stated above, inquiry is also concerned with the totality of the problem and how the conditions that give rise to the problem affect the process itself. Inquiry is also reflective. Dewey defines reflection as the “*active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which it tends*” (Italics Dewey, *HWT*, p. 6). As thinking creatures involved in inquiry we not only deliberate on the means to solve a particular problem, we also reflect on the conditions of the problem as they arise from the developmental continuum of our own lives and the cultures in which we live. Reflection in an instrumental sense is a phase of inquiry in which the awareness of the consequences of knowledge affects the value of the knowledge itself: “Reflection is the instrumentality of securing freer and more enduring goods...”(*EE*, p. 406). Reflection is a purposeful consideration of the *relations* between the means and consequences of knowledge. Furthermore, the reflective dimension of inquiry, like the deliberative, is a process

that arises organically out of the human condition, out of experience as an *ordering* of experience, a process through which experience and the objects of experience are given *meaning*. “Thinking is an ordering of subject-matter with reference to discovering what it signifies or indicates” (*HWT*, p. 188).

The product of inquiry is knowledge. “Knowledge, as an abstract term, is a name for the product of competent inquires” (*LTI*, p.8). But, because inquiry is an ongoing process, an endless interaction of organism and environment, “product” does not imply permanence. Knowledge is not a fixed-end: “Knowledge is an affair of *making* sure, not of grasping antecedently given sureties” (Italics Dewey, *EN*, p. 154). It is an instrument, not a thing. Knowledge, Dewey argues, is a temporary hypothesis assigned to objects and situations based on the needs of inquiry. “Knowledge is an act which confers upon non-cognitive material traits which *did* not belong to it” (Italics Dewey, *EN*, p. 381). It is a navigational and adaptive tool that helps individuals and groups purposively interact with and give meaning to the empirical world.

Knowledge, like the growth of a plant and the movement of the earth, is a mode of interaction; but it is a mode which renders other modes luminous, important, valuable, capable of direction, causes being translated into means and effects into consequences. (*EN*, p. 435)

### **Freedom and the Great Community**

Ultimately, Dewey argues, the virtue of instrumental knowledge is its ability to liberate the human organism from the immediacies of mere circumstance and chance. In a pragmatically instrumental sense, knowledge is a tool to enrich experience by giving us command over our circumstances. Because PI does not argue for any fixed-end such as Truth, but rather considers inquiry and knowledge to be a method of enriching experience within an ever-changing set of

existential contexts, the method of PI is a method of living in a fully conscious and emancipated way.

Genuine freedom, in short, is intellectual; it rests in the trained *power of thought*, in ability to “turn things over,” to look at matters deliberately, to judge whether the amount and kind of evidence requisite for decision is at hand, and if not, to tell where and how to seek such evidence. If a man’s actions are not guided by thoughtful conclusions, then they are guided by inconsiderate impulse, unbalanced appetite, caprice, or circumstances of the moment. To cultivate unhindered, unreflective, external activity is to foster enslavement, for it leaves the person at the mercy of appetite, sense, and circumstance. (Italics Dewey, *HWT*, pp. 66-67)

It is critical to remember, however, that Dewey conceptualizes the intellectual basis of freedom as always existing within a socially interactive context. The degree of one’s freedom is intimately bound to the social conditions within which one conducts inquiry. Freedom of thought is not freedom *from* others, it is the freedom to create and understand meaning *with* others. If, argues Dewey, human beings are to truly empower the adaptive functions of knowledge then the degree to which they create institutions that allow individuals and groups to practice habits of active inquiry directly affects the measure of meaning and freedom individuals and communities experience in their lives.

Government, business, art, religion all social institutions have a meaning, a purpose. That purpose is to set free and to develop the capacities of human individuals without respect to race, sex, class or economic status. And this is all one with saying that the test of their value is the extent to which they educate every individual into the full stature of his possibility. Democracy has many meanings, but if it has a moral meaning, it is found in



resolving that supreme test of all political institutions and industrial arrangements shall be the contribution they make to the all-around growth of every member in society. (*RP*, p. 107)

According to Dewey, when individuals and societies, collectively, employ knowledge in a pragmatically instrumental sense they are purposefully adopting habits and methods of intelligence that secure greater significance and meaning to experience. Inquiry is only effective in the degree to which it exists within a community devoted to its practice. One central pillar of that devotion is a fidelity to open communication among the community of inquirers. According to Rorty (1982), this “is the doctrine that there are no constraints on inquiry save conversational ones—no wholesale constraints derived from the nature of the objects, or of the mind, or of language, but only those retail constraints provided by the remarks of our fellow inquirers” (p. 165). The power of inquiry to enrich personal experience is directly proportional to the collective and cooperative contexts within which inquiry takes place.

The business of inquiry is with the ways in which specific constituents of human nature, native or already modified *interact* with specified definite constituents of a given culture; conflicts and agreements between human nature on one side and social customs and rules on the other being *products* of specifiable modes of interaction. (Italics Dewey, *FC*, p. 32)

For Dewey, then, the more openly inquiry can operate within a culture the more meaningful will be the experiences of individuals within that culture. The culture itself will be more than just an expedient association of individuals, it will be a purposeful community organized according to an “order of energies transmuted into one of meaning which are appreciated and mutually referred by each to every other on the part of those engaged in

combined action” (PP, p. 153). It will be a culture, in other words, that embraces democratic liberalism.

Intelligence after millions of years of errancy has found itself a method [PI], and it will not be lost forever in the blackness of night. The business of liberalism is to bend every energy and exhibit every courage so that these precious goods may not even be temporarily lost but be intensified and expanded here and now. (LSA, p. 93)

### **Critiques and Responses**

Two general critiques have long dominated the debate over Dewey’s instrumentalist account of knowledge: realism and critical theory.

#### **Realism**

The realist critique, offered most clearly by Karl Popper (2014), is that instrumentalism fundamentally denies reality. That is, because instrumentalism considers knowledge as an activity whose value is judged by the consequences of action, instrumentalist knowledge preferences *application* of knowledge over and above its *truth*.

For instrumental purposes of practical application a theory may continue to be used even after its refutation, within the limits of its applicability: an astronomer who believes that Newton’s theory has turned out to be false will not hesitate to apply its formalism within the limits of its applicability. (p. 151)

According to Popper (2014), because an instrumentalist account of knowledge is more concerned with the consequences of the knowledge than it is with whether the knowledge is right or wrong, instrumentalist knowledge is immune to any counterfactuals because what is right is what *works*, not what is true.

Since “right” here means “applicable,” this assertion merely amounts to saying, “Classical mechanics is applicable where its concepts can be applied”- which is not saying much. But be this as it may, the point is that by neglecting falsification, and stressing application, instrumentalism proves to be as obscurantist philosophy as essentialism. For it is only in searching for refutations that science can hope to learn and to advance. It is only in considering how its various theories stand up to tests that it can distinguish between better and worse theories and so find a criterion of progress. (p. 152)

Popper’s (2014) arguments come out of a class of philosophical arguments often referred to as realism. These arguments generally involve assertions that what we perceive, more or less, reflects the real world, and that science is the process of uncovering truths about that world. According to Ian Hacking (1984), there are two types of realism: realism about entities and realism about theories.

Realism about theories say we try to form true theories about the world, about the inner constitution of matter and about the out reaches of space. This realism gets its bite from optimism; we think we can do well in this project, and have already had partial success. Realism about entities - and I include processes, states, waves, currents, interactions, fields, black holes and the like among entities - asserts the existence of at least some of the entities that are the stock in trade of physics. (p. 72)

Realism about entities and realism about theories assume there are truths about both the observable and unobservable world. A realism about entities assumes that my perception of a tree is an accurate reflection of reality; realism about theories assumes that the theory of gravity, for example, is an accurate reflection of real processes and forces that we cannot directly observe.

Similar to Hacking's distinction between realism about entities and realism about theories is Devitt (1991) and Godfry-Smith's (2002) distinction between "common-sense realism" and "scientific-realism" (p. S3). "Common-sense" realism involves "a commitment to the objective, mind-independent existence of familiar middle-sized objects like stones, trees, and cats" and is "applied to macroscopic aspects of the world's structure that are encountered in everyday life, as opposed to unobservable aspects of the world described by scientific theories" (Godfry-Smith, 2002, p. S3). "Scientific realism" is the argument that the *theories* of science, as followed by the scientific method, basically explain relations and realities of the material (seen or unseen) world, and that the goal of science is to reveal the "objective" world as clearly and as truthfully as possible. Scientific realists argue that theories reveal the objective world because the theories correspond to our observations of the world, are predictive of future events, and can be falsified (Cherryholmes, 1992; Musgrave, 1998; Popper, 2014).

The importance of both sets of distinctions as formulated by Hacking (1984), Devitt (1991), Godfry-Smith (2002), and Popper (2014) help illustrate how Dewey's PI does or does not respond to realist critiques. Insofar as Dewey's PI is an instrumental account of knowledge about what is seen there is indeed reason to argue that Dewey is not a realist. That is, according Godfry-Smith (2002), if common-sense realism is understood as meaning that the objects of perception are independent of our minds, Dewey would indeed reject the common-sense argument--but *not* because he rejects the idea of independent reality. Instead, argues Godfry-Smith (2002), Dewey rejects the arguments for common-sense realism because it denies the interactive and transformational nature of the human mind on the objects and environments it encounters.

For Dewey, the role or function of mind is precisely to be a factor in the transformation and modification of the contents of the agent's environment. Insofar as the contents of the world make their own way independently of the activities of thought, thought has failed. (p. S4)

Dewey's PI assumes that to think is to manipulate and to be a purposeful agent affecting the relational scheme of every situation thinking enters. Much like Bohr's uncertainty principle in which the act of observation changes what is observed, to think in a pragmatically instrumental sense is to alter reality in so far as we always encounter reality through our experiences. Thus, argues Godfry-Smith (2002), Dewey's rejection of common-sense realism is not a rejection of common-sense *reality* but a rejection of the epistemological premise that objects are ever mind-independent whenever they are an object of thought.

As fully contextualized creatures, argues Dewey, what we do affects the experience of material objects around us. And what we do is driven by either purposeful intelligence or habit. Thus, our interactions with the natural world are always transformational; we are always affecting the world of perception. Dewey's PI is the claim that even in relation to everyday objects our behavior, habits, and purposes affect the actual realities of how and why we experience the objects themselves. Thus, any claim that objects exist independent of our mind is, according to Dewey, to assert that our minds and the objects of the world exist in two separate spheres of existence, rather than in an interactive relation.

When Dewey makes these claims about how thought changes the world, he does not mean it in anything like the sense of recent anti-realism. When Dewey says these things, he is making a claim about "mind" and "knowledge" in his larger sense; he is including

the causal role of behavior. Thought changes the world, but only via its effects on action.  
(Godfry-Smith, 2002, p. S4)

Similarly, to argue against mind-independence is not to argue that theories are less true than experience, nor to place means over and above ends. Dewey is not arguing that that abstract thought, generalizations, or universals are any less capable of being true just because they exist outside the immediate circle of my perceptions and experiences. Nor is he arguing that the truth or falsity of a claim is to be solely measured against how best the knowledge achieves a practical end. That is, PI is *not* a claim that reality is solely in the eye of the beholder. What Dewey *is* arguing is that scientific theories and our abstract notions of truth are not fixed-ends, they are working hypothesis until they are proven wrong. A PI conception of truth argues that a theory is true when it has been confirmed, is presently correct, and appears to explain a certain phenomenon or process. The truth or falsity of a knowledge claim, according to Dewey, is that truth and reality is probabilistic not absolute. “In short, one doesn't, as an instrumentalist, accept arbitrarily on credit; he accepts on probation, hypothetically, just as one accepts his own hypotheses when they first occur to him” (Dewey, 1912, p. 78).

PI, therefore, is not attempting to be a metaphysical description of Truth; it is a description of *meaning*. It is a description of the relationship between knowledge and reality and how it affects organic, human beings existing in the world. PI does not ask the inquirer to reject quantum mechanics because he cannot see or observe the electron; it simply insists that the reality of the electron, as presently understood, and as a general theory, is true insofar as it is confirmed in the actual conditions and experiences of humankind. PI is the claim that mankind's knowledge is a function of his organic and developmental existence and that questions about ultimate truths are chimeras and distractions more reflective of a “quest for certainty” than a

confirmation of fact (*QC*, p.187). There is no one Truth, there are truths whose meanings change depending on the empirical contexts and persons involved in inquiry. PI is an assertion about mankind's relationship to his empirical existence and how and why he comes to consider truths *meaningful*.

### **Critical/Political Critiques**

The second set of criticisms most commonly advanced against Dewey's instrumentalism are those that contend that PI is reductive and naïve.

Reductive arguments follow lines set out by Max Horkheimer (1947) and Herbert Marcuse (2010), two founders of the "Frankfurt School" (Joas, 1992). Both Horkheimer (1947) and Marcus (2010) argue that instrumentalism, to a greater or lesser degree, reduce reason to a method whose only values are those that reflect scientific rationalism and bureaucratic efficiencies. As Shalin (1992) argues, these thinkers "dismissed pragmatism as instrumental reason run amok, a technocratic decisionism severed from substantive-rational moorings" (p.237). Horkheimer (1947) and Marcus (2010) argue that reductive instrumentalist claims express and reproduce the values of the status quo, values that are inherently defined by the bureaucratic and technocratic norms of a complex industrial and capitalistic society.

Pragmatism, in trying to turn experimental physics into a prototype of all science and to model all spheres of intellectual life after the techniques of the laboratory, is the counterpart of modern industrialism, for which the factory is the prototype of modern industrialism, and which models all branches of culture after production on the conveyor belt, or after the rationalized front office. (Horkheimer, 1947, p. 50)

If, according to Horkheimer (1947) and Marcus (2010), instrumentalism is only a formal method in which the ends of reason are less important than the means of inquiry, then our ability

to uncover how institutional forces affect intellectual and moral norms becomes impossible. You cannot, according to Marcuse (2010), employ the same reason that is an expression of the system to investigate and critique the system. “Though the inquiry is seen in its organic and ‘cultural’ conditions, its structure will not be altered by these conditions. In fact, it ‘produces’ the world which stands in question for logic” (Marcuse, 2010, p. 264). Thus, critical theorists argue, when reason is reduced to instrumentation it invariably becomes subsumed under the imperatives of technocratic regimentation and is no longer capable of social criticism. “Whereas reason had once aimed to overshoot existing structures, thus allowing us to imagine a better possible world, pragmatism can only evaluate existing reality according to its capacities for efficiency, expediency, and predictability” (Kadlec, 2006, p. 528). Instead, critical theorists argue, reason should be used to critique the status quo, it must be partial: “critical thought becomes the precondition for human freedom. Rather than proclaiming a positivist notion of neutrality, critical theory openly takes sides in the interest of struggling for a better world” (Giroux, 1997, p. 44). The criticism against Dewey, then, is that his instrumentalism reduces reason to a method of confirmation, one in which the scientific method merely moves the pieces around the board of human behavior but does little to change the formal structures of industrial domination.

This line of argument leads to the other main criticism against instrumentalism—PI is socially and politically naïve.

While Dewey criticized capitalism, big business, and totalitarian ideologies, he failed to theorize comprehensively enough the systematic thwarting of democratic participation by modern social organizations and interorganizational environments. Because of his limited understanding of the complex connections between liberal democracy and the productive power of domination within modern organizations, Dewey could not fully come to terms



with the forces that make nonparticipatory institutions so hard to overcome, even when they are not propped up by brute coercion. (Antonio, 1992, p. 292)

Walter Lippman (1922/1925), Reinhold Niebuhr (1932), and Lewis Mumford (1926) each accused Dewey of promoting a naïve liberalism in which it was assumed that the deliberative processes of democracy could actually overcome the pernicious effects of big business and the corrosive effects of industrial capitalism.

In *Public Opinion* and *The Phantom Public*, Lippman (1922/1925) argued against any philosophy that put too much faith in the ability of the masses to govern themselves because the societies in which they existed had become so complex that an informed public opinion was impossible. According to Whipple (2005),

Lippmann contended that the masses were naturally and structurally unable to form intelligent, democratic publics. Lippmann thus advocated for the masses a basically passive role in the democratic process as spectators rather than participants, whose sole responsibility is to choose between one of two parties with few general differences. Thus, the crisis of democracy results, Lippmann argued, not from too little, but from too much democracy. The solution for this crisis, he argued, was to redistribute intelligence and the critical agency of political decision making away from the masses and toward a centralized body of intelligent elites. Lippmann was a forceful and important forerunner of democratic elitism. (p. 160)

Although Lippman (1922/1925) shared Dewey's interest in utilizing the methods of social science to inform public opinion, he was deeply pessimistic about the masses ability to process such information. As a "democratic realist," Lippman (1922/1925) insisted that the weakness of democracy was that it became more unmanageable the more the public participated

in it (Westbrook, 1991, p. 300). According to Lippmann (1922/1925), the primacy of self-determination and self-government were unrealistic goals for the vast majority of citizens. Instead, he advocated a “democratic elite” in which experts would ensure that public affairs operated for the betterment of all. His critique of Dewey’s PI was an argument against any instrumentalism that retained a naïve belief in the public’s ability to accurately form opinions within a highly complex industrial and technocratic society (DeCesare, 2012; Marres, 2005; Whipple, 2005).

In *Man and Immoral Society*, Reinhold Niebuhr (1932) argued that Dewey’s PI, in so far as it endorsed an individual’s ability to choose desirable democratic ends, ignored the inherently selfish and self-seeking nature of individual human beings; it was not that society was too complex but that men were inherently selfish and immoral. “Men will never be wholly reasonable” he argued,

and the proportion of reason to impulse becomes increasingly negative when we proceed from the life of individuals to that of social groups, among whom a common mind and purpose is always more or less inchoate and transitory, and who depend therefore on a common impulse to bind them. (p. 35)

Dewey, argued Niebuhr (1932), suffered from the delusion that the individual intellect could triumph over the obstacles of ignorance. According to Ryan (1995), because Niebuhr (1932) suffered from a “bleakly Protestant vision of fallen humanity” his faith in individuals to make reasonable decisions about self-government was lacking (p. 102). Instead, Niebuhr’s (1932) critique of Dewey emerged out of a broader belief in the need for a strong centralized state to regulate the immoral proclivities of individuals (Westbrook, 1991).

Finally, Lewis Mumford (1926) in *The Golden Day*, considered Dewey's pragmatism a form of "acquiescence." According to Westbrook (1991), Mumford (1926) argued that Dewey, had succumbed to a fixation with facts at the expense of values, actualities at the expense of desires, means at the expense of ends, technique at the expense of moral imagination, invention at the expense of art, practicality at the expense of vision. (p. 382)

Dewey had, according to Mumford (1926), given into a crass utilitarianism by advocating a valueless rationality. As Festenstein argues (1997), "Dewey's failure to articulate any scheme of values had allowed his conception of science as a generalizable mode of critical inquiry to be used as a technocratic ideology of scientific expertise" (p.19). That is, much like the arguments of the Frankfurt School, Mumford (1926) argued that Dewey's instrumentalism emphasized means and technique over and above ends and value.

Unlike the realist argument that criticized PI as being inherently subjectivist by valorizing consequences above truth, political theorists like Lippman (1922), Niebuhr (1932), and Mumford (1926) accused Dewey of a covert idealism in which instrumentalism as a force of individual and collective reason was imbued with powers that functioned more like articles of faith than of reality. A modern analog to the charge that Dewey is a closet idealist focuses on how Dewey grounds his critique of dualism and foundationalism. Specifically, Gale (2010) and Shook (2000) accuse Dewey of arguing for an empirical foundation to all knowledge, which, like idealistic first premises, require a fundamental belief in an empirical unity. Gale (2010) refers to this as Dewey's "Humpty Dumpty intuition":

The key to understanding the secret mystical philosophy of John Dewey is to take to heart the plight of poor Humpty Dumpty, who, it will be recalled, could not be reassembled by all the king's horses and all the king's men after he fell off the wall and

was shattered into many separate, distinct pieces. Reality, for Dewey, is Humpty Dumpty write large; for if we ever permit it to fall apart into numerously distinct individuals, not all the king's philosophers can put it back together again into relational complexes, be they casual, spatiotemporal, or of any other kind. (p. 60).

In other words, argues Gale (2010), Dewey's anti-dualistic philosophy argues for a foundational unity of knowledge (i.e., Humpty Dumpty before the fall) called "experience" from which all difference ultimately derives. Shook (2000), like Gale (2010), argues that Dewey's anti-dualistic arguments rely on the premise in which "Universal Mind was replaced in Dewey's philosophy not by nature, but by *experienced* nature" (p. 19). That is, argue Shook (2000) and Gale (2010), while Dewey's critique of dualism is an attempt to "overcome the Tradition," he ultimately commits himself to idealistic premises (Gale, 2010, p. 159). As Rorty (1982) argues, "Dewey, like Marx, wants Hegel without the Absolute Spirit" (pp. 46-47).

Against the claims of reductivism, Dewey's defense is evident across his writings. It is widely accepted that Horkheimer's (1947) reading of Dewey suffers from a basic misunderstanding of Dewey's PI, especially the argument that Dewey's pragmatism is a form of logical positivism. Even Marcuse (2010), who was highly sympathetic to Horkheimer's (1947) overall critique, did not consider Dewey a logical positivist. As discussed above, Dewey was not attempting to reduce all experience down to scientific and measurable truths. Instrumentalism is not an account of experience, it is an account of knowledge. As an account of knowledge it is just as much premised on an aesthetic account of experience as it is a scientific one. That is, *experiencing* is the foundation of existence, and it is only when experience becomes problematic that the instrumental goods of knowledge become necessary. Furthermore, Dewey clearly argued against inquiry as a robotic and purely technical act:

Only the psychology that has separated things which in reality belong together holds that scientists and philosophers think while poets and painters follow their feelings. In both, and to the same extent in the degree in which they are of comparable rank, there is emotionalized thinking, and there are feelings whose substance consist of appreciated meanings or ideas. (*AE*, p. 76)

To the charge that Dewey was naive about the powers of instrumental liberalism to overcome complex institutional and political processes, it is true that Dewey had a more optimistic belief in the power of individuals and groups to make deliberative decisions within a free and open democracy. This does not mean, however, that Dewey was ignorant of the pernicious capacities of market capitalism and technocracy to infect the conditions of maintaining a free and open democracy. In many ways, Dewey's prolific career expresses a wide interest in exploring the limits of this belief. As will be shown throughout this dissertation, Dewey openly endorsed applying the findings of social science to inform and shape the empirical realities of individuals and institutions. What Dewey clearly did not argue was that markets, technologies, or science *themselves* were deterministic and therefore impervious to conscious change. This is not to say that he argued for an understanding of these mechanisms as valueless, simply that he argued the power of these mechanisms resides in the uses to which they are put and are not intrinsic to the mechanisms themselves. He did not believe that there were social "forces" that worked over and above the experiences of human beings. These were, in his mind, reifications of adaptive behaviors. While industrialization might make commodification and exploitation easier, that is not the same thing as saying commodification and exploitation are inevitable.

Thus, to the degree that Dewey maintained a faith in the individual and the group to control their tools and organizations, Dewey clearly does not agree with Lippman (1922), Niebuhr (1932), or Mumford (1926). Dewey did agree that social and institutional conditions of an industrial society could and had actively influence the conditions of inquiry, but he argued that the process of inquiry, as a basic organic process of adaptation, can secure freedom if a community of inquirers desires and cultivates habits of active inquiry.

Against the charge that he is a closet idealist, one can argue that Dewey is not, ultimately, interested in establishing experience as an *entity* from which all truths must ultimately derive but in describing the relationship between knowledge and experience. While the charges that he is a closet idealist are potent, given his early affinity for Hegelianism, they also reflect the very type of analytical cul-de-sac Dewey was attempting to expose. While his anti-dualistic/anti-foundationalist critique might bear similarities to Hegelian idealism, he was not looking to build an epistemological system around any logical foundation of first principles. That is, PI is not an attempt to argue from or for specific conclusions or propositional certainties, rather it is an attempt to elaborate a naturalistic and methodological strategy and disposition towards knowledge. Dewey never argues for experience to be considered ultimate, in the sense of Absolute Spirit or the Good; experience is, instead, a term meant to designate the organic nature of existence as ever changing and complex. He is not trying to advance experience as a thing; he is simply insisting that *experiencing* is as valuable and important to an understanding of knowledge as are the conclusions of reason.

### **Conclusion**

I have chosen the term “pragmatic instrumentalism,” which Dewey uses in *The Quest for Certainty*, to describe the totality of the philosophical theses presented above. I am arguing that

PI is Dewey's philosophical contention that knowledge is the instrumental product of a specific conception of inquiry which occurs because of the specific way humans adapt to and give meaning to precarious existence. Dewey himself defines pragmatic instrumentalism as a way "to conceive of *both* knowledge and practice as a means of making goods--excellencies of all kinds--secure in experienced existence" (Italics Dewey's, *QC*, p. 37).

Dewey and others have employed similar terms to describe this same position—e.g., "empirical naturalism" (*EN*, p. 1a), "experimental empiricism" (*DE*, p. 156), "productive pragmatism" (Hickman, 2001, p. 155), "pragmatic technology" (Hickman, 1992, p. 1). I am using the term pragmatic instrumentalism because it captures, I think, the historical context of Dewey's overall philosophic program, and the specific arguments he puts forth regarding the production of knowledge as an instrumental good beyond "*mere* instrumentality" (*RP*, p. 98). I am arguing, as I believe Dewey does, that PI is the best term to describe two key elements of this philosophical outlook: first, the nondualist/anti-foundationalist claim that practice and theory, mind and matter, ideas and experiences are not distinct and insuperable entities, but symbiotic and natural stages in the process of inquiry. Knowledge is neither an ideal/rational substance existent unto itself, nor is it solely derivative of our sensory perceptions, it is a "mode of practical action and is *the* way of interaction by which other natural interactions become subject to direction" (*QC*, p. 107).

Second, is the emancipatory claim. PI is the belief that human intelligence is a reflective and deliberative process whereby human beings purposively control and form meaning both individually and collectively. As such, it is a means whereby the human organism makes itself aware of its own intentions and enables itself to move collectively and intentionally towards creating the conditions for greater social interaction, associative living, and the freedom to

continue inquiry. As an account of knowledge as a *human* instrument, PI argues that all knowledge is ultimately the result of a purposeful, deliberate, experimental, and reflective processes of inquiry in which the human organism adapts to, manipulates, and reflects on his relationship to organic experience by being aware of the consequences of the process of thinking itself.

The instrumental theory only attempts to state with some scrupulousness *where* the value is found and to prevent its being sought in the wrong place. It says that knowing begins with specific observations that define the problem and ends with specific observations that test a hypothesis for its solutions. But that the idea, the meaning, which the original observation suggest and the final ones test, itself requires careful scrutiny and prolonged development.... (RP, p. 85)

PI argues, therefore, that the *total act* of inquiry and the production of knowledge arises out of a specific existential context, is a purposeful act of solving problems according to experimental method and processes, and is a process that continually adjusts the basis of its conclusions according to the consequences of the knowledge produced. That is, knowledge is only fully instrumental when the process by which it is produced is *itself* demystified and open to continual reexamination based on the consequences of the act of inquiry. Dewey called this the “pragmatic rule”: “in order to discover the meaning of the idea ask for its consequences” (RP, p. 94). Dewey also referred to this as the “double movement of all reflection”:

All knowledge, all science, thus aims to grasp the meaning of objects and events, and this process always consists in taking them out of their apparent brute isolation as events, and finding them to be parts of some larger whole *suggested by* them, which, in turn,



*accounts for, explains, interprets them; i.e., renders them significant. (Italics Dewey, HWT, p. 118)*

Thus, PI is not a method of discovery and spectatorship, it is a method of continual investigation and participation in the formation of empirical meaning. The former, the spectator, conducts inquiry "...like a man in a prison cell watching the rain out the window; it is all the same to him;" the latter, the pragmatic instrumentalist, conducts inquiry "...like a man who has planned an outing for the next day which continuing rain will frustrate" (*DE*, p. 124).

### **Chapter 3 Pragmatic Instrumentalism as a Philosophy of Technology**

This chapter will argue that Dewey's pragmatic instrumentalism can be interpreted as a distinct and consistent position within the field of philosophy of technology. First, I will introduce the guiding premise underlying many of the interpretations of PI as a philosophy of technology. Second, I will demonstrate how this premise is related to Dewey's thinking about science and industrial change. Third, I will summarize some of the basic divisions within the field of philosophy of technology. Fourth, I will explain how Dewey's PI as a philosophy of technology developed out of and interacts these divisions. Fifth, I will argue that the significance of Dewey's PI as a philosophy of technology is that it argues for technology as both non-deterministic and value-laden.

#### **Toward a Deweyan Philosophy of Technology**

In one of his last books, *The Problems of Men*, Dewey (1946) made explicit his belief that instrumentalism, experimentalism, and technology were all ways to describe the same process of active inquiry: "It is probably that I might have avoided a considerable amount of misunderstanding if I had systematically used 'technology' instead of 'instrumentalism' in connection with the view I put forth regarding the distinctive quality of science as knowledge" (1946, p. 291). This interlocking of terms is more than just a rhetorical choice; it is a philosophical claim that philosopher Don Ihde (1993) argues makes Dewey "the first to model *philosophy itself upon a technological mode of inquiry*" (Italics Ihde, p. 42).

Philosopher Larry Hickman (1992/2001), the director of the Center for Dewey Studies at Southern Illinois University and author of two highly influential works on the subject *John Dewey's Pragmatic Technology* and *Philosophical Tools for Technological Culture*, argues that Dewey's pragmatic instrumentalism (which Hickman refers to as "pragmatic technology" and

“productive pragmatism,” interchangeably) is an account of technology that can be understood as “the sum of concrete activities and products of men and women who engage in inquiry in its manifold forms: in the sciences, in the fine and useful arts, in business, in engineering, and the arts we call political” (Hickman, 1992, p. 202). According to Hickman (1992), “technology may thus be thought of as a family of methods and tools that evolves in response to the needs and goals that it is called upon to serve, and in response to the uses to which it is put” (p. 61).

Long before Hickman (1992), Sydney Hook (1927) made a similar argument in his book *The Metaphysics of Pragmatism*. Understanding Deweyan pragmatism, he argues, “...must start with a consideration of ‘the instrument’ and follow its lead into the subject matter which is, so to speak, instrumentalized” (p. 6). According to Hook (1927) “this emphasis on ‘the instrument’ is not an evasion of a metaphysics but a challenge to one” (p. 6). Hook (1927), like Hickman (1992) after him, argued for an interpretation of Dewey’s pragmatic instrumentalism that clearly considered thinking itself to be an instrument:

thought or inference steps in as an instrument and pieces stray hints together, manipulating things, mentally reconstructing the situation in order to discover what is partially beyond and temporally remote. Therefore, what is true of all instruments is true of thought as an instrument. (Hook, 1927, p. 28)

Hickman (1992) argues that a pragmatic account of technology considers inquiry itself to be a technology because inquiry “...is the means of effective control of an environment that is not what we wish it to be” (p. 41). As a specific theory of inquiry, PI “discloses its technological character” because it asserts that “every reflective experience is instrumental to further production of meanings, that is, it is technological” (pp. 40-41). Hickman (1992) argues that “while there may be good ground elsewhere for distinguishing extra-organic tools from those

that are inter-organic—a hammer from a ‘therefore,’ for example—such a distinction is not appropriate for Dewey’s technologized theory of inquiry” (p.36). Thus, when Dewey (1927) writes,

...“instruments” denote objects having a definite existential status and office, and that “action” does not cease to be continuous with the energies of nature when it is expressed in the behavior and habits of a living organism. There is then no difficulty in making it clear that thought, which in science deals with the objects which have the status of instruments, is itself a further tool of a distinctive type, and yet like other instruments, one set to operate in a common world of existences (p. 4),

he is fundamentally arguing, according to Hickman (1992), that “controlled thinking is technological insofar as it utilizes tools and instruments: some of those tools are conceptual, some physical, some, the hardware that extends our limbs and senses” (p. 36). To argue thusly is to assert that “the theory of knowledge is the theory of the instrument” (Hook, 1927, p. 46).

### **Dewey’s Interpretation of Technological Change**

Much of Dewey’s belief in the technological nature of inquiry comes out of his particular understanding of the history of science. His understanding is one that contrasts the experimentalism of the seventeenth and eighteenth century and the technological advancements of the nineteenth and twentieth century against the “fixed-end” teleology of the classical world. For Dewey “the scientific revolution of the seventeenth century was the precursor of the industrial revolution of the eighteenth and nineteenth” (*PP*, p. 175). Dewey argued that the methods of science as developed out of the seventeenth and eighteenth centuries, coupled with the rapid changes wrought by the industrial revolution, were not only different from the science

and technology that dominated Western culture after Aristotle, but they also marked a significant turning point in man's entire approach to nature, himself, and the process of intelligent inquiry.

While a complete treatment of Dewey's thinking on this matter would be well outside the purview of this dissertation, how Dewey articulated the difference between the scientific ethos of the ancient world and the modern world greatly affected how he conceptualized the technological advancements of the industrial revolution. His understanding of that difference, in turn, affected how he and others interpret his pragmatic instrumentalism as a philosophy of technology. It is thus important to highlight the central arguments Dewey puts forth about the history of science and the impact of the industrial revolution in order to comprehensively approach Dewey as a philosopher of technology.

### **Old and New Science**

Dewey argued that the classical, Aristotelian notion of philosophic inquiry, in so far as it represented as the first incarnation of scientific inquiry, rested on the idea of the universe as a closed system. "The world in which philosophers once put their trust was a closed world, a world consisting internally of a limited number of fixed forms, and having definite boundaries externally" (*RP*, p. 31). Within this world of fixed-ends, "there are only a limited number of species, kinds or sorts. And the world is essentially a world which falls into sorts; it is pre-arranged into distinct classes" (*RP*, p. 34). According to Westbrook (1991), Dewey argued that, Greek philosophy thus had the salutary effect of eliminating myths and superstitions and setting up the ideals of science and a life of reason (for some), but it did so without challenging the dualism of attention and regard established by primitive religion. (p. 349)

That is, according to Dewey, a classical science of fixed ends, while laudable as a rational method breaking away from primitive religious metaphysics, was still a “glorification of being over becoming and of knowledge over justified belief” (Murphy, 1990, p. 63).

The implications of a closed system metaphysics, Dewey argued, regulated knowledge to observing, documenting, and contemplating. Dewey referred to this as the “spectator” conception of knowledge or the “correspondence theory of truth” (Sleeper, 1986, p. 21). Spectatorship conceptualizes science and inquiry as solely designed to “get a better *view* of something already there, like making a journey to a museum to inspect the objects found in it” (*LTI*, p. 88). In classical science, because objects were considered predetermined and static, the goal of inquiry was to discover the “essence” of the substance under consideration. Discovering an object’s “essence” was the way to reveal the underlying structure of the universe. Thus, argued Dewey, in a classical, Aristotelian science, “definition and taxonomic classification are necessary forms of knowledge because they are expressions of necessary forms of being” (*LTI*, p. 87).

Furthermore, argued Dewey, classical science believed discovering “essence” relied on understanding a teleological order. According to the *Oxford Companion to Philosophy*, teleology comes from the Greek word “telos” and is a causative theory that “attempts to account for things and features that appeal to their contribution to optimal states” (Bogen, 1995, p. 868). Classical teleology argued that all objects, *intrinsically*, tend towards predetermined ends, towards a full expression of their essential nature. An example of classical teleological thinking is Aristotle’s argument that an acorn is destined to become an oak tree. According to Aristotle, all matter, be it an acorn or a human, tends towards a fixed point where, assuming full development, it expresses the entirety of its predestined Being. In classical science, according to

Dewey, this belief undergirds both the idea of species and of physical movement: “because the teleological principle that *knowable* change tends towards a limited fixed end, all motion was thought to tend naturally to come to a state of rest. This notion controlled science till, say, Galileo” (Italics Dewey, *LTI*, p. 90).

As noted in the previous chapter, classical science thus fostered a duality between “pure” knowledge and contingent knowledge. “Pure” scientific knowledge was the discovery of forms, essences, and qualitative stability. “In Greek science, Nature was a qualitative, a bounded and closed, whole. To know any special subject was to know it as a whole in its proper place in the comprehensively inclusive whole, Nature” (*LTI*, 93). According to Dewey, the implication of such a premise is that rational abstraction is considered more real than experience because experience changes, is impermanent, and is highly contextual (see chapter two). Thus, in antiquity, science was closely aligned to contemplative deductive knowledge (“pure”) as the best method to uncover and promulgate unassailable facts.

Pure knowing is pure beholding, viewing, noting. It is complete in itself. It looks for nothing beyond itself; it lacks nothing and hence has no aim or purpose. It is most emphatically its own excuse for being. Indeed, pure contemplative knowing is so much the most truly self-enclosed and self-sufficient thing in the universe that it is the Highest and indeed the only attribute that can be ascribed to God, the Highest Being in the scale of Being. Man himself is divine in the rare moments when he attains to purely self-sufficient theoretical insight. (*RP*, p. 63)

### **The Scientific Revolution of the Seventeenth and Eighteenth Century**

Beginning with the Renaissance and into the Enlightenment period of the seventeenth century, “modern” scientific thought, Dewey argued, emerged as an empirical science concerned

more with the relational changes *between* objects than with establishing a fixed and unalterable whole.

The work of Galileo was not a development, but a revolution. It marked a change from the qualitative to the quantitative or metric; from the heterogeneous to the homogeneous, from intrinsic forms to relations; from esthetic harmonies to mathematical formulae; from contemplative enjoyment to active manipulation and control; from rest to change; from eternal objects to temporal sequence. (*QC*, pp. 94-95)

It was, quite literally, a Copernican revolution, one that shifted scientific thinking towards understanding the universe mechanistically and experimentally.

By the end of Newton's lifetime, the picture of the universe (in its physical aspects) as a vast mechanism akin to clock-work was well on its way to general acceptance among intelligentia. The creator was revealed to have been a mechanic and a mathematician, who absented Himself from active participation after having set the cosmic machinery in motion. (Philips, 1992, p. 37)

Philosophically, the "Cogito Ergo Sum" (I think therefore I am) of Descartes expressed both a personal liberation of mind from organized religion and a growing belief that the mysteries of the universe were fully discoverable and rational; they follow a mechanistic order all their own in which the substances of mind are separated from the substance of body. Thus, according to Rorty (1982),

Galileo and his followers discovered, and subsequent centuries have amply confirmed, that you get much better predictions by thinking of things as masses of particles blindly bumping each other than by thinking of them as Aristotle thought of them—animistically, teleologically, and anthropomorphically. (p. 191)



Unlike the classical logic of Aristotle, scientific thinking in the seventeenth and eighteenth centuries also marked a rise (but not a perfecting) of experimental science. For Dewey, this is a critical development. The rise of experimental science, he argued, represented a more purposeful form of inquiry in which the knowledge gained becomes part of a wider process of inquiry, one that brings together “the conjoint process of *analysis and synthesis*” (HWT, p. 152). For Dewey, this development was well illustrated by the paradigm shift created by Darwin’s *Origin of Species*.

In “The influence of Darwinism on Philosophy,” Dewey (1910) argued that “prior to Darwin the impact of the new scientific method upon life, mind, and politics, had been arrested,” beset, Dewey felt, with an antiquated inability to rid itself entirely of Aristotelian fixed-ends (p. 8). Although the scientific revolution “emancipated, once and for all, genetic and experimental ideas” it took Darwin’s theory of natural selection to “foreswear inquiry after absolute origins and absolute finalities in order to explore specific values and the specific conditions that generate them” (p. 13). What Darwin unlocked for science and for Dewey was the argument that science could broadly apply a “newly gained naturalism” to the pursuit of knowledge, and it could do so according to and because of evolutionary theories and the development of experimental methods (White, 1943, p. 121; Hook, 1927).

Dewey’s history of the development of an experimental scientific method relies on a belief that the scientific revolution *introduced* experimentalism, but it was not until the development of evolutionary theory that experimentalism, as a method of naturalistic inquiry, truly takes hold in the general sciences. Prior to this development, science still struggled with a more empirically based epistemology (empiricism) in which Enlightenment dualities of the material and mental still animated scientific thinking. It lacked “a metaphysics that stressed the

continuity of existence without denying the qualitative distinctiveness of its various forms” (Westbrook, 1991, p. 335). Fundamentally, Dewey argued, the scientific revolution of the seventeenth and eighteenth century introduced--but did not fully adopt--a structure to thinking (the scientific method) that relied more on the values of experimentation than solely on the findings of perceptual experience and rational logic.

### **The Industrial Revolution**

While Darwinian evolutionary theory greatly impacted Dewey’s turn to experimental naturalism, an equally potent influence was the rapid industrialization and technological change occurring within Dewey’s lifetime. In the course of his life (1850-1952) Dewey witnessed the invention of the telephone, phonograph, radio, light bulb, television, refrigerator, automobile, airplane, and nuclear bomb. He lived before and after the invention of antibiotics, the theory of evolution, germ theory, psychology and quantum physics (Hickman, 1992). “One can hardly believe” he wrote in 1899,

...there has been a revolution in history so rapid, so extensive, so complete. Through it the face of the art is making over, even as to its physical forms; political boundaries are wiped out and moved about, as if they were indeed only lines on a paper map; population is hurriedly gathered into cities from the ends of the earth; habits of living are altered with startling abruptness and thoroughness; the search for truths of nature is infinitely stimulated and facilitated, and their application to life made not only practicable, but commercially necessary. Even our moral and religious ideas and interest, the most conservative because deepest-lying things in our nature, are profoundly affected. (SS, p. 9)

These profound changes had equally profound effects on his philosophical outlook. One such effect was Dewey's belief that there was a direct connection between technological advances in the instruments of science and the powers of inquiry: "the combined effect of science and technology has released more productive energies in a bare hundred years than stands to the credit of prior human history in its entirety" (*LSA*, p. 76). Science itself, he argued, "is marked by the adoption and invention of material devices and related techniques:--of complex and refined forms of apparatus and definite related techniques of using apparatus" (*LTI*, p. 391). According to Hickman (1992),

Dewey thought that the experimental tools and methods produced by seventeenth-century sciences and further developed during the first industrial revolution did not so much constitute a radical break in the progress of inquiry as they did a giant step forward for inquiry. (p. 10)

For Dewey, the collusion of science and technology was the clear extension of an instrumental account of knowledge. Like pragmatic instrumentalism itself, the merging of new experimental methods in science and the rapid acceleration of new tools and technologies during the industrial revolution channeled the scientific method toward "an affair of *making* sure, not of grasping antecedently given sureties" (*EN*, p. 154). That is, when the aims of the scientific revolution were brought together with the rapid advancements in technological instruments, Dewey claimed, an instrumental account of knowledge was made more manifest; knowledge, because of science and technology, could finally move away from the "contemplative to [the] operative" (*RP*, p. 70):

When the appliances of a technology that had grown more deliberate were adopted in inquiry, and the lens, pendulum, magnetic needle, lever were used as tools of knowing,

and their functions were treated as models to follow in interpreting physical phenomenon, science ceased to be identified with appreciative contemplation of noble and ideal objects, was freed from subjection to esthetic perfections, and became an affair of time and history intelligently managed. (*EN*, p. 150)

Furthermore, Dewey argued that the advances in science and technology clearly demonstrated that the material and intellectual tools of experimental science could and had advanced the cause of human purpose and culture. However, while Dewey believed such advances validated a PI account of knowledge, such change had been underutilized in considerations of social and philosophical philosophy. He argued that in the same way that the dualities of philosophy grew out of antiquated premises of mind and body, so too outdated philosophical positions of the pre-industrial age affected an understanding of industry and science itself. “It is evident” Dewey wrote, “... that the rapid industrialization of our civilization took us unawares. Being mentally and morally unprepared, our older creeds have become ingrowing; the more we depart from them in fact, the more loudly we proclaim them” (*ION*, p. 8). Dewey argued that modern culture was, to borrow Lincoln’s phrase, a “house divided against itself” (*ION*, p. 8). The division was between the new methods of science and technology and the inability of culture to use those methods to solve social and political problems.

As discussed in chapter two, Dewey’s PI is part of a larger project of philosophical reconstruction. This is also true of Dewey’s technological theory. Dewey argues that science and technology are not just a “body of conclusions” but “an attitude embodied in habitual will to employ certain methods of observation, reflection, and test rather than others” (*FC*, p. 112). He argued many of the social and political problems of the modern world would go unsolved unless

there was a change in disposition and a development of new habits of thinking based on epistemologies that reflected the actualities of scientific and technological discovery. Science, he argued, “was a constituent of culture” and culture itself needed to adopt a “scientific attitude” and bring that to bear on its communal problems (*FC*, p. 112). Ultimately, Dewey argued, “the measure of civilization is the degree in which the method of cooperative intelligence replaces the method of brute conflict” (*LSA*, p. 82). Industry, he argued,

... is not a materialistic or merely utilitarian affair. It is a matter of intelligence. Its record is the record of how man learned to think, to think to some effect, to transform the conditions of life so that life itself became a different thing. It is an ethical record as well; the account of the conditions which men have patiently wrought out to serve their ends. (*SS*, p. 153)

Culturally and philosophically, Dewey argued that the problems associated with industrialization could be accounted for based more on the misuse of science and technology than on the science and technology itself. It was Dewey’s belief that this misuse was driven by misguided and habitual fidelities to pre-industrial and pre-scientific philosophies. It was, he argued, a conflict “...between institutions and habits originating in the pre-scientific and pre-technological age and the new forces generated by science and technology” (*LSA*, p. 77). The technological and scientific gains made in his lifetime, he argued, exposed the world as an opportunity for investigating and solving problems, not, as the Ancients had argued, as just a museum to be documented:

Every gain in natural science makes possible new aims. That is, the discovery of how things *do* occur makes it possible to conceive of their happening at will, and gives us a

start on selecting and combining the conditions, the means, to command their happening. (*HNC*, p. 235).

Thus, argued Dewey, “the specific problem of philosophical reconstruction at the present time” was the inability of philosophy to recognize and apply the epistemological shift brought about by technology and science to the needs and purposes of existential, communal existence: “while we have been reasonably successful in obtaining command of nature by means of science, our science is not yet such that this command is systematically and preeminently applied to the relief of the human estate” (*RP*, p. 25). If science, and by extension technology, “were treated as what it is, the method of intelligence itself in action, then the method of science would be incarnate in every branch of study and every detail of learning” (*LSA*, p. 53).

It is this optimism in the ability of human purpose and control to bring science and technology to bear on the “relief to the human estate” that distinguishes Dewey’s PI as more than just a theory of knowledge, but also as a philosophy of technology distinct from other positions within the field.

### **Philosophy of Technology**

The argument that PI is a distinct philosophical position about technology has grown out of the literature associated with the field of philosophy of technology. I will focus primarily on two specific accounts of the field: Carl Mitcham’s (1994) classic work *Think Through Technology: The path between engineering and philosophy*, and Andrew Feenberg’s (1999) *Questioning Technology*. Each work provides a manageable foundation for considering the field.

A full explication of all the philosophical positions within this field would be neither prudent nor manageable for the purposes of this dissertation. However, a complete understanding of Dewey’s PI as a philosophy of technology requires a familiarity with some of

the major players and theories. Thus, the following should not be taken as a comprehensive history of the field, but as a broad conceptual map through which the philosophical significance of Dewey's thinking can become more articulated.

Another important caveat. I use the words "field" and "discipline" to delineate this branch of research, but these two terms are openly disputed. Philosophy of technology has long struggled to step out of the shadow of the more recognized literature associated with the philosophy of science. Because many of the concerns of philosophy of science touch on many of the same philosophical problems as technology, the confusion is understandable. According to Ihde (2004),

Philosophy of technology has not, to date, generated recognizable and sustained internal arguments. For example, were one to draw from earlier Kuhnian language, a "normal science" or discipline, is one which follows a "paradigm" or has a recognizable set of issues and problems which it addresses. From such a perspective, philosophy of technology remains more "pre-paradigmatic" than its family cousins, either the earlier arrived philosophy of science, or its chronological peer, science studies. (p. 125)

For this reason, there is still a significant argument over whether philosophy of technology should or should not be considered a sub-discipline of philosophy of science and subsumed under disciplinary disputes therein. For the purposes of this study, these matters are best left to the side. Regardless of whether it deserves the distinction as a discipline or a field there continues to be a healthy literature devoted to articulating philosophical problems dealing with and defining "technology." It is out of this literature that almost all of the work on Dewey's philosophical positions regarding technology have been conducted.

## **EPT and HPT**

The most well-regarded account of the history of the philosophy of technology is Carl Mitcham's (1994) work *Thinking Through Technology*. The central argument of the book is that two distinct approaches dominate how we think about technology: an engineering philosophy of technology (EPT) and a humanities philosophy of technology (HPT). An engineering philosophy of technology (EPT) starts from an "analysis of technology from within, and [is] oriented toward an understanding of the technological way of being-in-the-world as paradigmatic of other kinds of thought and action..."(p. 39). This perspective,

begins with the justification of technology or an analysis of the nature of the technology itself...it then proceed[s] to find that nature manifested throughout human affairs and, indeed, even seeks to explain both the nonhuman and the human worlds in technological terms. (p. 62)

As a result, argues Mitcham, EPT tends to be more narrow and to reduce human pursuits "into their language, to view the larger human world in technological terms" (p. 64). An EPT starts from a set of premises that tends to be favorably disposed to technology as a force of progress, development, and advancement. Problems are generally assessed according to the efficacy of technologies. EPTs approach technological problems as problems of fine tuning, integration, or design and generally do not question the value of actual technology itself.

The humanities philosophy of technology (HPT) is "the attempt of religion, poetry, and philosophy to bring non- or transtechnological perspectives to bear on interpreting the meaning of technology..."(p. 39). HPT "or what might also be termed hermeneutic philosophy..." seeks, insight into the meaning of technology--its relation to the transtechnical: art and literature, ethics and politics, religion. It typically begins with nontechnical aspects of the



human world and considers how technology may (or may not) fit in or correspond. (pp. 62-62)

HPTs approach technological problems by considering the role of the technology itself in the composition of the problem or situation under consideration. For HPTs, investigating technological problems extends beyond just fine tuning or analyzing the direct design effects of the technology to a consideration of the impacts, be they overt or covert, as they occur across cultural, social, and political dimensions. HPTs evaluate technology from outside the actual technology and do not start from justificatory premises. HPTs generally ask, What is being gained and what is being lost by the adoption of particular technologies?

EPT and HPT approach similar technological problems from distinctly different perspectives, including the term technology itself. According to Mitcham (1994), EPT has a more restrictive conception of “technology,” one that is “reserved for engineers for more direct involvement with material construction and the manipulation of artifacts” (p. 147); whereas, an HPT’s approach to the term “technology” is “stimulated by recognition of the social significance of making activities allied with modern natural science” (p. 150).

These different orientations play out in other ways as well. For example, an EPT might approach the problems of distinguishing machines, tools, and cybernetics as merely taxonomical, whereas an HPT might consider the distinction ontologically. For instance, in cases of artificial intelligence, an EPT might be primarily concerned with developing the software and technological context according to which an artificial intelligence might operate; an HPT might be more concerned with determining what distinguishes human intelligence from artificial intelligence and what are the ethical implications of the distinction. Another example can be found in the way in which EPTs and HPTs approach and conceptualize the difference between

inventing, designing, and producing a technological artefact. An EPT might primarily conceptualize the differences methodologically and logistically; whereas an HPT might conceptualize the difference according to political, social, and cultural contexts. Ultimately, argues Mitcham (1994) the difference “is between different ends or criteria for judgment” (p. 140). Two examples from Albert Borgmann (1984) and Don Ihde (1979), both philosophers within the field, might help to illustrate this distinction even further.

### **Focal Things and Devices**

**EPT-Fireplaces and Furnaces.** Consider the difference between a fireplace and central heating. Both are forms of technology. Both, to use Hickman’s (1992) definition of technology, “bring tools to bear on raw materials” in the effort to solve the problem of cold (p. 12). How then are we to understand the difference between these two technologies? An EPT might consider the difference from the position that the fireplace distributes heat in a less uniform way thus making it less efficient. It burns wood, rather than natural gas, and the wood to heat ratio not only releases more carcinogenic pollutants into the atmosphere, but it also restricts the heat to a narrower circumference depending on the specific design, size, and placement of the fireplace itself. Central heating, on the other hand, burns natural gas, which is cleaner, and can be distributed via ducting throughout the entire house. It can be modified with greater precision and it can be controlled from a central distribution hub.

**HPT-Fireplaces and Furnaces.** An HPT analysis, such as Albert Borgmann’s “device theory” (1984), conceptualizes the relationship between a fireplace and furnace quite differently. Borgmann (1984) argues that the difference between these two technologies is more than a difference between heat distribution, it is also a difference between the social impacts of “focal things” versus “devices.” In this example, the “focal thing” is the fireplace and the “device” is

the furnace. Unlike the EPT approach, Borgmann (1984) argues that the fireplace and the furnace are much more than just utilitarian instrumentalists of heat dispersal:

A thing, in the sense in which I want to use the word here, is inseparable from its context, namely, its world, and from our commerce with the thing and its world, namely, engagement. The experience of a thing is always and also a bodily and social engagement with the thing's world. In calling forth a manifold engagement, a thing necessarily provides more than one commodity. Thus a stove is used to furnish more than mere warmth. It was a *focus*, a hearth, a place that gathered the work and leisure of a family and gave a house a center. (pp. 41-42)

Focal things, like a fireplace or wood burning stove, center activity and create an interactive point that continually modifies the social context of those using the thing. Animals, people, and processes gather around a fireplace and through those associations contextualize the work that is done through and because of the thing itself. In Borgmann's (1984) theory, focal things are more than what they are functionally designed for, they are also how they shape and are shaped by the social environment.

A device, on the other hand, "makes no demands on our skill, strength, or attention, and it is less demanding the less it makes its presence felt" (p. 42). According to Borgmann (1984), devices like a furnace, decontextualize heat and

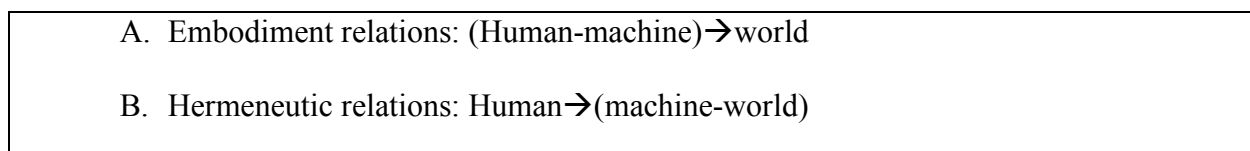
dissolve the coherent and engaging character of a pretechnological world of things. In a device, the relatedness of the world is replaced by a machinery, but the machinery is concealed, and the commodities, which are made available by the device, are enjoyed without the encumbrance of or the engagement with a context. (p. 47)

In the case of central air, the device “commoditizes” heat and changes the means-end distinction by enabling the properties of the device to be removed from the context within which the device operates. “The machinery or the means is subservient to and validated by the function or the end” (p. 43).

Borgmann (1984) argues that the effects of the change from a focal thing to a device is more than just a difference in the calculations of engineers. While Borgmann (1984) does have a pessimistic view of technological progress, a point Mitcham takes up below, Borgmann’s (1984) analysis is helpful when considering the relationships between technological artifacts and the user that extend beyond mere utility.

### **Embodiment and Hermeneutic Relations**

Don Ihde (1979) has taken this distinction even further, arguing that there are many other phenomenologically interesting ways that we experience technologies. He has famously argued that there are two basic relations between people and technologies: embodiment relations and hermeneutic relations (see Figure 1).



*Figure 1.* Idhe's (1979) Embodiment and Hermeneutic Relations.

“Embodiment relations” occur *through* the use of a machine. When I use a piece of chalk, or a pen, or drive a car, “The machine is ‘between’ me and what is experienced and is a ‘means’ of experiencing” (p. 8). I use a cell phone, and through the use of that cell phone I am able to talk to my friend across town. The cooperation between me and the cell phone binds me to the instrument as a means of experiencing the world. “What is important,” argues Ihde (1979) “is that the *difference* between naked perception and machine mediated experience is that there occurs a subtle cross-sorting in which one becomes ambiguous in relations to the other”

(Italics Idhe, p. 11). That is, at its most basic, whenever I use a phone there is an empirical ambiguity between my experience of the conversation and my experience of the conversation as phone-mediated.

Conversely, hermeneutic relations are those that “move from experiencing through machines to experiences of machines” (p. 11). For instance, the more noticeable a phone is as a phone, generally because it is not functioning smoothly (“can you hear me now?”), the more it disrupts the mediation it was designed to perform. It then rises to my cognitive attention as a technological object, and the machine itself is brought into stark relief. This experience of the phone *as* a phone is, according to Idhe (1979), a fundamental change in my relation to the device.

Idhe (1979) argues that the “qualitative differences between embodiment and hermeneutic relations also suggest two quite different trajectories for investigation” (p. 36). Embodiment relations focus more on the human-instrument symbiosis because the transformation of perception is what is of foremost concern. For instance, the phone can be thought of as a magnification device; it operates by magnifying the power of my hearing to traverse distances between me and the other person on the phone. The phone’s success, as a device of perception, depends on the seamlessness with which it does its job, to magnify the basic perception of hearing. Therefore, the more it mediates the more transparent the device itself becomes. By successfully magnifying a perception it retreats behind its function. However, consider the case of the telescope and the microscope. Both amplify sight, but they also reveal worlds that are not available to normal perceptions. Like the phone, their mediating value is closely aligned with their transparency, but the instrument itself is much more conspicuous because it makes the experience of the mediated world possible in ways it could not be

otherwise. I can still hear without a phone; I cannot see microscopic organisms without a microscope.

What is more, both embodiment and hermeneutic relations do more than just magnify experience, they also *transform* experience. For instance, in the case of the telescope, not only does it allow us to see the previously unseen, it also “transforms space as distant and makes it near...not only is the apparent surface of the moon changed (now filled with valleys and mountains) but the apparent position of the observer is changed (now as if flying overhead at a certain altitude)” (p. 23). That is, the telescope fundamentally transforms how we conceptualize space and distance.

This transformation happens through the *reductive* tendencies of technologies as well. Again, consider the telephone. Ihde argues (1984), “the phone may be called a ‘mono-sensory’ device, it reduces the other to a voice” (p. 24). That is, while the phone shortens distance it also changes the nature of the relationship with the other person by amplifying some properties over and above others. Like Borgmann’s (1984) distinction between focal things and devices, the magnification/reduction structure of technological artifacts affects the perceptual experiences and cognitive framing of those using the devices in contextual and empirical ways.

Borgmann (1984) and Ihde (1979) demonstrate just two specific ways that HPT’s approach technological *objects*. Mitcham (1994) argues that the HPT/EPT divisions also occurs across a whole range of other dimensions. For instance, philosophers of technology also think about the how technologies can be considered as a type of knowledge, as an activity, and as a type of volition. As with Borgmann (1984) and Ihde (1979), philosophers think about the differences between understanding technologies as objects by investigating the differences between utilities, tools, or machines; as a type of knowledge, philosophers think about

technologies in relationship to maxims, rules, and theories; as an activity, philosophers think about the differences between making, designing, maintaining, and using; and as a type of volition philosophers think about whether technologies are active or passive agents. Across each dimension, HPTs and EPTs approach the technological discourse differently but with the same level of complexity that Borgmann (1984) and Idhe (1979) approach considerations of technological objects.

### **Reconciling HPT and EPT via Dewey**

Mitcham clearly prefers the HPT conception, arguing that it is more inclusive of an EPT orientation than an EPT orientation is of an HPT. However, Mitcham (1994) also recognizes that much of the HPT literature

too often seems to be a philosophy of antitechnology and to close itself off in romantic subjectivity from technological aspects of the human—aspects that are the fundamental constituents of the contemporary techno-lifeworld, if not of the human world at all times and places. (p. 64)

What Mitcham (1994) argues for instead is a mediating framework that can reconcile the narrow, reductive tendencies of EPT against the insular luddite-like romanticism of HPT.

Mitcham (1994) argues that the framework for such a reconciliation exists in the pragmatic philosophy of Dewey. “Dewey’s philosophy of technology” Mitcham writes,

sees technology not as something opposed to value (and hence to democracy, ethics, art, etc.), as antitechnology cultural critics would have it, or as neutral with regard to value, as scientists and engineers think. It is a value, one that must be integrated with other values in culture not by monistic, technocratic management but through “pluralistic planning.” (p. 73)

Mitcham (1994) argues that a possible union of EPT and HPT and the “proper to thinking about technology that does not exclude engineering discourse” can and does occur within a pragmatic framework (p. 267). Ultimately, he argues, “pragmatic instrumentalism could be interpreted as a sophisticated engineering philosophy of technology” (p. 73).

I am hesitant to characterize pragmatic instrumentalism in the same way as Mitcham simply because one major consistency throughout Dewey’s career is an adamant disavowal of dualities. By calling PI a “sophisticated engineering philosophy of technology” there is a danger that Mitcham (1994) is committing Dewey to a narrow practical philosophy that Dewey may not entirely approve. Much depends on Mitcham’s (1994) use of the adjective “sophisticated.” While Dewey was no idealist, he argued strongly against any notion that theoretical and practical knowledge belonged to different realms. They are, instead, intertwined and exist along a continuum of inquiry. What is clear, however, is that Mitcham’s (1994) account of the history of the philosophy of technology considers Dewey’s pragmatic instrumentalism as a distinct and unique framework through which philosophical problems of technology can be considered.

### **Autonomy versus Human Control**

Another useful account of the philosophy of technology comes from Andrew Feenberg’s (1999) book *Questioning Technology*. In it he argues that thinking about technology depends heavily on the degree to which philosophers believe technological advancement is ultimately autonomous and deterministic or whether technology is or is not under the control of human purpose (see Table 1). In the broadest sense this division falls along a deterministic/instrumentalist divide with arguments favoring autonomy following some form of determinism, and arguments favoring human control following some form of instrumentalism.



Further division occurs across this divide according to whether theorists consider technologies inherently value-neutral or inherently value-laden.

Table 1

*Feenberg's Variety of Theories*

<b>Technology is:</b>	<b>Autonomous</b>	<b>Humanly Controlled</b>
<b>Neutral</b> (complete separation of means and ends)	<b>Determinism</b> (e.g. traditional Marxism)	<b>Instrumentalism</b> (liberal faith in progress)
<b>Value-Laden</b> (means form a way of life that includes ends)	<b>Substantivism</b> (means and ends linked in systems)	<b>Critical Theory</b> (choice of alternative means-ends systems)

**Determinism**

According to Feenberg (1999), technological determinism can be defined as the “claims that technologies have an autonomous functional logic that can be explained without reference to society” (77). Feenberg (1999) argues that two premises undergird this belief: (1) “technological progress appears to follow a unilinear course, a fixed track, from less to more advanced configurations”; (2) Technological determinism “affirms that social institutions must adapt to the ‘imperatives’ of the technological base” (p. 77). Technological determinists can see these premises as either positive or negative. In a positive sense, technological progress equals social progress. To borrow again from Mitcham (1994), an EPT might argue that technological advancement is an overall positive in that it increases the efficiencies and expediencies of social and material well-being. Feenberg (1999) argues that progressives, inspired by Marx and

Darwin, were early proponents of this idea: “following the then common interpretation of these materialist masters, technical progress was believed to ground humanity’s advance toward freedom and happiness” (p. 2).

In some instances, this positive view of technological determinism assumes that technologies are value-neutral. For instance, according to Michael Zimmerman (1990), “for Marxists, technology is not in and of itself alienating or destructive, but becomes so under the aegis of capitalism” (p. 251). Thus, when Marx argues that “the hand-mill gives you society with the feudal lord; the steam-mill society with the industrial capitalist” he is not arguing that the technologies *themselves* produce the social outcomes, but that the technologies empower specific political outcomes (Shaw, 1979, p. 155). Thus, argues Feenberg (1999), “deterministic theories, such as traditional Marxism, minimize our power to control technical development, but consider technical means to be neutral insofar as they merely fulfill natural needs” (p. 9).

### **Substantivism**

Negative conceptions of determinism take a more pessimistic view of technological advancement, arguing that certain value structures are embedded within technologies and that these structures inevitably bend social, political, and ethical norms to suit technological values. Value-laden deterministic theories, which Feenberg (1999) calls “substantivist,” “share deterministic skepticism regarding human agency but den[y] the neutrality thesis” (p. 9). On this account, what is “substantial” about the technologies are the intrinsic values that the technologies overtly and covertly spread. Substantivist thinkers such as Martin Heidegger (1977) and Jacques Ellul (1964) argue that technological advancement is more negative than positive because technologies, especially post-industrial revolution, operate according to imperatives and

ideologies all their own. What is more, these imperatives and ideologies are unstoppable because we have lost control of technology itself. According to Hickman (2001), this position ...can be summarized as follows: technology is ubiquitous and insidious. It is a system with its own laws, and it is beyond the control of any human institution or combination of them. It allows no standpoint for criticism from the inside. Increased control by human beings is no longer possible. (p. 151)

### **Instrumentalism**

Other theorists argue that humans *do* have control of their technologies. Like their deterministic and substantivist peers, humanly controlled theorists argue that technologies are either instrumental in a value-neutral way or instrumental in a value-laden way.

Value-neutral instrumentalists, according to Feenberg (1999), have a “liberal faith in progress” (p. 9). They argue that technologies, when employed in a responsible way, can and do bring greater equity, social justice, and higher standards of living. Importantly, this position does not, however, contend that the technologies themselves embody those values, but that technologies are simply empty vessels waiting to be put to good use. Winner (1989) describes this as the “tool-use idea” in which

we tend to believe that there is an entirely obvious connection between the thing desired and the means to its fulfillment. One begins with the preconceived end in mind. Then one decides upon an appropriate instrument or organization of instruments to achieve that end, usually weighing the advantages of two or more alternative methods. Next comes the actual use of the instrument in the way established for its successful exercise. Finally, one achieves certain results which are judged according to the actual end. (p. 228)

Hickman (2001), influenced by Winner (1989), calls this “straight-line” instrumentalism. He argues that “straight-line instrumentalism depends upon some sort of scientific or metaphysical realism to provide its inflexible goals” (p. 73). That is, argues Hickman (2001), while value-neutral instrumentalism is associated with a humanly controlled “liberal faith in progress,” it is also premised on realist fixed-end epistemologies. I will be returning to this characterization in more detail below when I consider Dewey’s possible responses to Feenberg’s instrumentalist claims.

Feenberg (1999) also distinguishes between what he calls primary and secondary instrumentalism. Primary instrumentalism is the “aspect that contains the *functional constitution* of technical objects and subjects;” “secondary instrumentalism is focused on the *realization* of the constituted objects and subjects in actual networks and devices” (p. 202). These two aspects of instrumentalism are relational descriptions. In the primary relation the instrumental technological object is decontextualized (a tree becomes lumber), reduced to its most useful technical qualities (lumber is hard, solid, capable of holding a screw), automated (the worker framing the house gets lumber at a factory), and positioned (lumber can be used for some things but not for others). The primary instrumental relation is thus the process that abstracts the object and makes it ready for technical application.

Secondary instrumentalism is the process whereby the object is “integrated with the natural, technical, and social environments that support its functioning” (Feenberg, 1999, p. 205). In this relation the object is brought into a system (lumber becomes a frame for a wall), mediated (particular lumber may be chosen for its aesthetic quality or for its sustainability), associated with a vocation (lumber is typically used by carpenters, laborers, construction workers), and asserts initiative (the lumber carries certain values of centralized industrial control that it asserts,

with consent, on the worker using it). These processes of secondary instrumentalism make the object a concrete reality by integrating it within a system that “assign functions, orient choices and insure congruence between technology and society” (Feenberg, 1999, p. 205). If primary instrumentalism is the process of abstracting the object and readying it for technical application, secondary instrumentalism is the process of the technical application of the object to a particular setting and society.

### **Critical Theories**

Unlike the value-neutral theories of instrumentalists, humanly-controlled technological theories can also argue from a *value-laden* perspective. According to Feenberg (1999), this perspective is closely associated with or inspired by the critical theorists of The Frankfurt School. Theorists such as Marcuse (1964), Habermas (2011), and Foucault (1977) argue, in varying degrees of specificity, that technologies “embody a certain type of rationality” that reproduce and construct inequities of power and stratified social and political value systems (Antonio & Kellner, 1992; Feenberg, 1996, p. 9). In ways similar to value-neutral determinists, critical theorists conceptualize modern technological progress as a system that “...incorporates domination in its very structure. Our technical disciplines and designs, especially in relations to labor, gender, and nature, are rooted in a hegemonic order” (Feenberg, 1999, p. 178). Unlike determinists and substantivists, however, critical theorists argue that the values of technological rationality can be transformed by bringing “...these embodied norms to consciousness where they [can] be identified and challenged” (Feenberg, 1999, p. 177). Critical theorists argue that the intrinsic values of technologies are discoverable and ultimately changeable *if* there is a political and social will to change the reward structures that empower technological stratification.

## **PI as Humanly Controlled and Value-Laden**

Where exactly Feenberg (1999) positions Dewey's PI is not made explicit in *Questioning Technology* other than to suggest that Dewey had an "uncritical confidence in science and technology" (p. 136). Again, following Mitcham (1994), I am not sure I agree with Feenberg's assessment that Dewey's "confidence" was "uncritical." Dewey certainly argued that science and technology, especially the scientific method, represent the most effective method of thinking, but Dewey was not naïve about the social and political consequences of rapid industrialization. Dewey's faith, instead, relied on a belief in the productive powers of intelligence to meet and solve the empirical problems of human existence.

I also think Feenberg's (1999) notions of instrumentalism are too narrowly drawn. While he attempts to conceptualize instrumentalism in a way that allows for social values to affect the means and ends, he only does so in so far as it occurs in secondary instrumentalism. I get the sense that although Feenberg (1999) considers both primary and secondary instrumentalism as activities of use, there remains a vague notion that abstraction and application occur in conceptually separate realms. This is a distinction I do not think Dewey would abide. As with Mitcham (1994), attempts to delineate theory and practice, or abstraction and application are anathema to Dewey's PI. "The fact is" Dewey (1912) writes, "that life, the experience (including the organic acts of ideas, opinions, judgements, etc.) of 'individual man' is already saturated, thoroughly interpenetrated, with social inheritances and references" (p. 81).

## **Conclusion**

What I hope to have shown through an explication of Mitcham (1994) and Feenberg's (1999) works is a clear overview of the thematically prevalent orientations within the field. Furthermore, the inclusion of Borgmann (1984) and Idhe (1979) was meant to demonstrate what

are some of the specific conclusions reached within one particular orientation. Across each of these accounts my intention has been to expose some of the methods prevalent within the field and, by extension, position Dewey's PI as a particular orientation within the broader discussion.

Dewey is not a determinist. Pragmatic instrumentalism is premised on the beliefs that inquiry and knowledge are processes through which mankind manipulates and controls his experiences according to a purpose; science and technology are a natural development *of* this process as well as contributors *to* this process.

It is also clear that Dewey understood all inquiry, and by extension technology, to be value-laden because, as a process and an artefact, it is always contextualized within a particular social and cultural setting. Although the world is increasingly technological, it is still an open and ever-changing interaction of people and things where the means and ends of inquiry are constantly reorganizing the conditions of experience according to the consequences of active inquiry itself. To consider technologies as deterministic and value-neutral is to intellectualize the technological process and technological objects as over and above empirical reality.

While technologies can and do condition experience by limiting or expanding the conditions of inquiry, they do not, of themselves, determine the ends of experience because the ends, themselves, are not fixed. Thus, Dewey's PI is not a technocratic valueless rationality, nor a cold utilitarian decision-making process striving to arrive at the best possible outcome; it is an interactive social process of adaptation, existing within a particular milieu (increasingly technological) whose value is determined by what meanings are chosen in relation to the practical consequences of empirical action.

This is a critical component of PI as a philosophy of knowledge and as a philosophy of technology. As a method PI reflects back on itself based on the consequences of its actions, and

by so doing it makes the process itself an object of inquiry. Dewey's differences with certain critical theorists is not a difference in the conclusion that forces (technological or otherwise) operating within communal association often affect the nature of the association, it is with the belief that these forces are something other than social constructions, and that there is no way to modify them. A PI account of technology argues that by applying technological and scientific methods to studying the *ends* to which specific technologies are directed, the *manner* in which the technologies are directed (thoughtfully or habitually), and the empirical *conditions* that contextualize the interactive situation, humans can intelligently expose and affect the realities of the human technological relationship towards ends they desire.

Dewey was not, however, naïve. In many ways he accepted the critical arguments about the *potential* of technologies to warp social purposes towards technocratic ends. He certainly understood and argued against the tendencies of technologies to exacerbate economic stratification, the alienation of labor, and the monotonous regimentation that comes from deskilling. But, as noted above, Dewey did not consider these tendencies deterministic. Dewey doesn't consider the technology as the problem, but a lack of social and political will to be the problem. Again, however, this doesn't mean he believes technology is value-neutral; it simply means that technologies require human behavioral and intellectual complicity to actually condition inquiry. Technologies, for instance, that appear antithetical to the values of democracy do so either with our approval or because we are still habituated to old ideas of knowledge. But they *are* choices.

That we have become aware of the conditioning problems of technologies is validation of the process of inquiry itself. The development of technologies happens within a context of inquiry for the purpose of solving problems. When experiences become problematic we are



capable of intellectually reassessing our situation and making different choices. Technologies both arise out of and assist in this problem solving process. Again, however, it is important to remember that not all experience takes place within the context of inquiry. Most experience is pre-conscious or habitual. It is only when experiences, including those intersecting with or through technologies, become problematic that the process of inquiry is necessary. All thinking begins with a problem.

Thus, an operational definition of a PI account of technology argues that *technologies, as thought processes and as tools, can and do help us to observe, plan, and manipulate our empirical lives towards ends we find desirable based on the problems we encounter in particular social contexts.*

## Chapter 4 Dewey's Philosophy of Education

Dewey's philosophical interest in education began early in his career and at a time in American history when material and demographic pressures were challenging the foundational assumptions about the purposes and aims of education. Progressive political reforms, massive surges in immigration, a rise in urbanization, and the rapid material changes of industrialization put pressures on the American public schools to reconsider traditional notions of curriculum, access to higher education, and the structure and aims of the American high school (Cremin, 1961; Rury, 2016; Tyack & Cuban, 1995). While there is debate about how influential Dewey's ideas about education eventually proved to be, it is difficult to dispute that he was a central figure in the educational debates of the Progressive Era (Lagemann, 2000).

Beginning in 1899 with the publication of *The School and Society*, Dewey's philosophy of education extends across a core group of works: *The Child and the Curriculum* (1902), *How We Think* (1910), *Schools of Tomorrow* (1915), *Democracy and Education* (1916), and *Experience and Education* (1938). My focus in this chapter is less on presenting a comprehensive summary of Dewey's philosophy of education than it is with explaining how his curricular ideas about "education through occupations" help articulate the relationship between his ideas on education, knowledge, and technology (*DE*, p. 309). Before I can do that, however, I must first explain the historical context within which Dewey developed his philosophy of education. I will then argue that Dewey's ideas about education through occupations brings together his philosophy of knowledge, his philosophy of technology, and his philosophy of education by making three interrelated sets of arguments: developmental arguments, technological arguments, and instrumental arguments. I will then address some of the common criticisms of Dewey's philosophy of education and Dewey's response to these criticisms.

## Progressive Reform

Like the broader progressive reform movement inspiring women's suffrage, worker's rights, and child-labor laws, progressive educational reform

began as a part of a vast humanitarian effort to apply the promise of American life—the ideal of government by, of, and for the people—to the puzzling new urban-industrial civilization that came into being during the later half of the nineteenth century. (Cremin, 1964, p. viii.)

The puzzle at the root of this reform was the massive demographic and technological shift taking place in America, and its effect on the basic organization of American schools. According to Tyack & Cuban (1995),

By the 1890's the schools had a new world on their doorstep. America was becoming the most powerful industrial nation on earth and aware of its rivalry with the fast-rising economy of Germany. Vast corporations were gaining power undreamed of only a decade or two earlier. Violent strikes were erupting. The cities were drawing millions of new recruits from the farms and immigrants from abroad. Social philosophers were wondering if institutions such as the family could continue their traditional functions of socializing the young. (p. 49)

Dewey and other progressives like Jane Addams and Dorothy Day worried about the social value of industrial progress, especially industrial practices that appeared to dehumanize the individual. Morton & Saltmarsh (1997) argue that Dewey, Addams, and Day believed that industrial change was fomenting a “crisis of community”:

The general contours of the problems of community are to be found in what Addams, Day, and Dewey perceived as the fragmentation of a unified American culture by the

combined forces of industrialization, and immigration, and by the increasing centralization of political and economic power in the hand of a private industrial elite.

The immediate symptom of this fragmentation...was a devolution of the ordinary persons role as a citizen and the emergence of a new role as an individual consumer of goods and services. (p. 139)

Many of the progressive concerns over the dehumanizing aspects of rapid industrial progress also focused on how industrial and technological forces were affecting the American public school system, both administratively and pedagogically.

### ***The Committee of Ten Report and The Cardinal Principles of Secondary Education Report***

In 1893 and again in 1918, the largest education association in America, the National Education Association (NEA), published two reports: *The Committee of Ten Report (1893)* and the *Cardinal Principles of Secondary Education Report (1918)*. Each report, in different ways, advocated a specific set of reforms meant to help define, shape, and organize the rapidly developing American high school, where, between 1890 and 1930, "...a new secondary school was established nearly every day" (Rury, 2016, p. 137).

Both reports provide insights into the prevailing educational debates of the Progressive Era because each report takes a different approach concerning the structure and purpose of American public schools. A common interpretation of these two reports is that the *Committee of Ten Report* advocated reforming but not eliminating the classical and traditional curriculum, while the *Cardinal Principles Report* advocated a more progressive, differentiated, and "socially efficient" curriculum (Kliebard, 2004; Krug, 1964; Ravitch,1983). Because Dewey was a unique and active voice within these debates, and because many of the structures that developed out of

these reports persist to this day, it is critical to take the time to elaborate the central tenants of each report before examining Dewey's specific contribution.

***The Committee of Ten Report.*** Led by the president of Harvard University Charles Eliot, the *Committee of Ten Report* (1893) was the first major attempt by the NEA to bring some sense of order to the rapidly growing and expanding American high school. While the committee itself was made of ten principle members--among them the United States Commissioner of Education William Torrey Harris and the presidents of the University of Michigan, Vassar, University of Colorado, and the University of Missouri-- the *Report*, according to one member of the committee, actually represented the culmination of "the judgement...of some ninety educators chosen from all classes of schools and colleges, East, West, and South--venerable eastern universities, modern state endowments, great city high schools, historic academies, vigorous private schools" (Mackenzie, 1894, p. 148).

The *Report* was designed to address the lack of common norms that existed from high school to high school. Highly disparate curricula, schedules, and standards resulted in a high variability in the quality of students entering American colleges and universities. To allay these concerns the committee advocated, among other things, that high schools be four years long (starting two years sooner than they had previously), and that there be established uniform dates for college entrance examinations. The *Report* also advocated a series of curricular reforms based on two central arguments: all students should be taught the same regardless of their intended life trajectories or likelihood of graduation, and there should be a set of core subjects all students must take--specifically language, history, mathematics, and natural science (Kliebard, 2004):

Both for those who are to carry on their education no farther, and for those who are to choose a special line of development, it is desirable that a course be planned which shall include the essential of all sound education, -language, history, mathematics, natural science. The gain to the youth in an acquaintance with the elements of these different lines of interest, before his decision [to drop out or not] is made, cannot be overestimated. (Taylor, 1894, p.195)

The *Report's* curricular reforms have been widely interpreted as the last gasp of the classical tradition because they maintained a relative fidelity to a traditional approach to curriculum. The core subjects, although not strictly classical in a medieval sense, still advocated a disciplinary approach to curriculum and harbored, it has been argued, some nascent loyalty to a faculty psychology in which certain subjects were preferenced over and above others (Bohan, 2003; Labaree, 2011; Ravich, 1983). However, while the *Report* did in a sense cohere around a core set of disciplines that many have come to regard as vestiges of a time before industrial change, it also sought to modernize the curriculum by, for example, recommending language studies move away from the strict formalisms of classical Latin and Greek. Thus, as Kliebard (1999) argues:

Even for Elliot, long a champion of humanist causes and normally sensitive to making invidious distinctions among human beings, the new industrial regime required a fundamental alteration not only in the education of children, but also in our very image of ourselves as Americans in the way democracy itself was conceived. (p. 43)

In general, the *Report* was well received, but not all reformers were on board with the recommendations. Almost immediately, some reformers resisted the idea of a core curriculum organized around academic disciplines, preferring instead a curriculum focused on more

developmental goals. Thinkers like G. Stanley Hall (1901), known for their “child-studies,” were early critics of the Committee of Ten. Much like European reformers Pestalozzi and Froebel who were inspired by Rousseau’s child-centered empiricism, Hall (1901) advocated a more developmental and psychological approach to teaching and learning that emphasized the child’s centrality in the construction and implementation of curriculum (Baker, 1998; Null, 2004). Hall (1901), “proceeded basically from the assumption that the natural order of development in the child was the most significant and scientifically defensible basis for determining what should be taught” (Kliebard, 2004, p. 11). In his essay the “Ideal School Based on Child Study,” Hall (1901) advocated an outlook towards education that emphasized the innate proclivities of children to guide curriculum, rather than norms that insisted curriculum conform to disciplinary knowledge:

The guardians of the young should strive first of all to keep out of nature’s way, and to prevent harm, and should merit the title of defenders of the happiness and rights of children. They should feel profoundly that childhood, as it comes fresh from the hand of God, is not corrupt, but illustrates the survival of the most consummate thing in the world; they should be convinced that there is nothing else so worth of love, reverence, and service as the body and soul of the growing child. (pp. 24-25)

Hall (1901) argued, as did others, that basing a curriculum on a static series of subjects was less about learning than it was a reflection of the influence colleges and universities had on setting the norms for high school: “few institutions of modern civilization so distrust human nature as does the modern, American high school, when under college domination” (p. 39).

The truth is that while the *Committee of Ten Report* was the first major recognition that schools needed to reform in the face of cultural and material change, the curricular aims it recommended were already changing soon after its release. According to Edwin Dexter (1906),

The report of the Committee of Ten seems not to have influenced directly to a marked degree the curriculum of public high schools. This does not mean that it has not fully justified itself through directing thought to the problems of the curriculum and making those problems, so to speak, conscious of themselves; but with the shaping of its details it has had little to do. In fact, more of the specific recommendations of the committee have been violated by the trend of high-school organization, or have proved inert, than have been followed. (p. 269)

***The Cardinal Principles Report.*** In 1918 the NEA put out another report entitled the *Cardinal Principles of Secondary Education Report* reflecting the influence Hall (1901) and others were having on the debate surrounding curriculum. The *Cardinal Principles Report*, unlike the *Committee of Ten Report*, expressed a growing belief in the need for a more expansive interpretation of the influence schools should have over the future of their students. According to Lagemann (2001), the *Cardinal Principles Report* argued

that high schools should direct their efforts towards promoting growth in seven different areas: health, command of the fundamental processes (the 3 R's), worthy home membership, vocation, citizenship, worthy use of leisure time, and ethical character.

Unlike the earlier report of the NEA's Commission on the Secondary School Studies—commonly known as the Committee of Ten—*Cardinal Principles* did not recommend an essentially uniform academic core. Instead, it pushed for a curriculum that included many



different types of subjects, more flexibility in academic requirements, and increased student guidance and testing. (p. 101)

The *Cardinal Principles Report* was a clear break from the uniform and core curriculum recommendations in the *Committee of Ten Report*. Although the “3r’s” were included in its list of seven principles, the report was philosophically a significant “shift from intellectual to behavioral objectives in schooling” (Graves, 2010, p. 99). What is more, by recommending attention be paid to other imperatives such as ethical character and vocational studies, the *Cardinal Principles Report* was attempting to reorient the center of balance in the curriculum away from just mental and intellectual pursuits and towards a curriculum based more on psychological and organizational differentiation. In other words, argues Rury (2016), the committee “encouraged schools to follow the path of social efficiency” (p. 138).

**Defining social efficiency.** The phrase “social efficiency” is frequently associated with the Progressive Era of education and with the debates over whether educational aims should reflect a more vocational curriculum or a liberal arts curriculum. However, it is important to note that the term “social efficiency” is historically opaque, as there is no one common meaning associated with its usage. “Historically speaking, social efficiency was a widely used, poorly defined, highly problematic term that had multiple uses for multiple scholars between the years 1890s and the 1930s” (Fallace & Fantozzi, 2013, p. 148). It is therefore important to take a moment and consider some of the most common usages of the term.

According to Krug (1964), the term has two distinct meanings—social efficiency as social control and social efficiency as social service:

The spirit of reform in American society demanded an explicit social mission for the schools, and many sought to supply its definition. From this came supposedly new

doctrines of schooling, reflecting latter-day efforts to resolve the perennial dilemma of the individual and the group. One expression of this quest was expression for social control; the other, education for social service. Soon they came together in one slogan, education for social efficiency. (p. 249)

When social efficiency is used to connote social service, the phrase is meant to express an approach to curriculum that emphasizes moral and civic duty. Schools should, it is argued, help guide students towards habits and dispositions that help them value morals and character traits that support the smooth and cooperative functions of living in associative societies. As argues Knoll (2009), this sense of the term emphasized that “the self-expressive tendencies of the child were to be reconciled with the demands of society” (p. 362).

Krug (1964) and Null (2004) claim that the idea of social efficiency as social service was first articulated by William Chandler Bagley, superintendent of the Dillion Montana public schools and vice president of Montana State’s Normal School. Bagley defined “social efficiency [as] a moral position about the relationship of the individual to society” (Null, 2004, p. 102). Bagley’s early adoption of the term reflected an attitude towards educational reform in which schools were seen as unique institutions capable of efficiently promoting character development and social service for the good of society:

Bagley was concerned throughout his life about the extent to which individuals learned of channeling their own individual wants, needs, and desires toward the good of society as a whole...Bagley wanted students to learn to contribute to social reform or to social advancement through their contributions to American culture. (Null, 2004, pp. 103-104)

In many ways, Bagley’s understanding of social-efficiency as social service reflected the developmental and psychological shift Hall (1901) had advocated. Although Bagley’s

conception was more focused on social and civic outcomes than Hall's (1901) individual and developmental outcomes, a social-service conception of social efficiency still evolved out of a basic desire to incorporate social and behavioral ends as central to curricular aims.

The other interpretation of the phrase, social efficiency as social control, reflected an idea of social efficiency in which "the interests of society were to supersede the needs of the child" (Knoll, 2009, p. 362). Callahan (1962) has argued that reformers who understood social efficiency as social control were inspired by the scientific management guru Fredrick Winslow Taylor (1911) and his book *The Principles of Scientific Management*.

The sudden propulsion of scientific management into prominence and the subsequent saturation of American society with the idea of efficiency together with the attacks on education by the popular journals made it certain that public education would be influenced greatly. (Callahan, 1962, p. 52)

As a highly-regimented management system, Taylorism, according to Wirth (1974), also reflected "the various pressures on schools to introduce offerings to meet complex skill needs of an industrial America including phenomenon like manual training, commercial and agriculture education, home economics, and trade-training courses" (pp. 169-170). That is, social efficiency as social control embraced the idea of organizing schools more efficiently according to principles of scientific management and for a conception of schools as efficient mechanisms to prepare students for life--specifically, a life of labor.

Thus, according to Callahan (1962), educationists such as E.L. Thorndike, who argued for the belief in "the importance of individual differences based on inherited traits and characteristics," were expressing not just the importance of recognizing psychological differentiation, they were also advocating that schools be institutions to prepare students for

industrial labor (Lagemann, 2000, p. 58). Educational theorists such Thorndike, Charles Judd, Franklin Bobbitt, Charles Prosser, and David Snedden pushed for schools to be increasingly conceptualized as institutions for training the young to meet the burgeoning demands of an industrial economy (Fallace & Fantozzi, 2013). Snedden, for example, advocated for “an extreme form of vocational education tailored to specific job destinations” (Drost, 1977, p. 24). Charles Prosser, the Executive Secretary of the National Society for the Promotion of Industrial Education, wanted to “reject the impractical manual training of the general education and replace it with ‘real vocational education,’ by which he meant training for useful employment” (Wirth, 1974, p. 173). Franklin Bobbitt argued “education is primarily for adult life, not for child life. Its fundamental responsibility is to prepare for the fifty years of adulthood, not for the twenty years of childhood and youth” (qtd. in Kliebold, 1999, p. 53).

What is important to note about the entire spectrum of meanings associated with “social efficiency,” as well as the difference in curricular focus between the *Committee of Ten Report* and the *Cardinal Principles Report*, is that the Progressive Era did not have one unified and cohesive philosophical outlook; rather, it represented an era in American educational history in which there was a general acceptance of a need to reform schools in response to the rapidly changing technological and demographic changes of the nation but there was a general disagreement about what that reform should look like. On the one hand were reformers who thought schools should try to preserve the classical curriculum alongside organizational changes; on the other hand, were those who thought the curriculum should reflect a more utilitarian approach in which the developmental and occupational realities of students and society should guide educational decisions. According to Rury (2016),

The two reports provide an interesting contrast, and they have fascinated generations of historian. One perspective advocated a largely academic high school, with only minor differences between the programs students should take. The other provided for considerably more diversity in curricula, but also emphasized the school's role in socializing youth for a democratic society. In reality, the schools of the time probably embraced neither of these ideal types. (p. 139)

What is clear is that the educational debates existing between roughly 1870 and 1930 expressed a general sense of urgency towards rethinking and reorganizing the curriculum in ways reflecting the actual industrial technologies and industrial norms being invented right before educators' eyes. David Tyack (1974) has famously divided this debate into pedagogical progressives and administrative progressives. Pedagogical progressives, argued for a new education that emphasized the freedom of the learner; administrative progressives argued for a more centralized, efficient, and bureaucratic system (Tyack & Cuban, 1995). Between both groups there existed a general sense that education needed to be organized according to scientific principles that were both more humanistic and efficient. It is out of this context that Dewey's philosophy of education developed.

### **Dewey's Education Through Occupations**

Dewey's philosophy of education is composed of three sets of interlocking arguments: developmental arguments that emphasize the promotion of growth through educative experiences, technological arguments that emphasize learning within and through an occupational context, and instrumental arguments that emphasize the development of habits of active inquiry.

## Developmental Arguments

The foundation of Dewey's philosophy of education is to see "...education in terms of life-experience" (*EE*, p. 51). For Dewey, focusing on life-experience means focusing the aims of education on the development of individual growth. As with many of his contemporaries, Dewey was concerned that the "traditional curriculum" relied too heavily on antiquated methods of instruction and ignored the importance of individual experience in the process of learning. "The traditional scheme is, in essence, one of imposition from above and from outside. It imposes adult standards, subject-matter, and methods upon those who are only growing slowly toward maturity" (*EE*, pp. 18-19). Instead, Dewey argued that "the criterion of the value of school education is the extent in which it creates a desire for continued growth and supplies means for making the desire effective in fact" (*DE*, p. 53).

In *Experience and Education* Dewey makes a distinction between "educative" and "mis-educative" experiences. An educative experience, according to Dewey, is any experience that increases the physical, moral, and intellectual growth of a student and makes further educative experiences possible; a mis-educative experience is any experience that distorts or retards growth:

The belief that all genuine education comes about through experience does not mean that all experiences are genuinely or equally educative. Experience and education cannot be directly equated to each other. For some experiences are mis-educative. Any experience is mis-educative that has the effect of arresting or distorting growth of further experience. An experience may be such as to engender callousness; it may produce lack of sensitivity and of responsiveness. Then the possibility of having richer experience in the future are restricted. (*EE*, pp. 25-26)

Like his later theories of inquiry where Dewey rejected the idea that knowledge was set “over against” experience, Dewey’s arguments for educative experiences rejected the idea that the “curriculum and the child are set over against each other” (CC, p. 201). Dewey argued instead that educational aims should

1. ... be an outgrowth of existing conditions...based upon a consideration of what is already going on; upon the resources and difficulties of the situation
2. ...be flexible...be capable of alteration to meet circumstances
3. ... must represent a freeing of activities. (DE, pp. 104-105)

Unlike traditional curricular approaches that conceptualize subject matter as a fixed entity outside and independent of those learning the content, for Dewey the value of education is measured according to how well the educative experience promotes growth in the individual student. “There is no such thing” Dewey argues, “in educational value in the abstract” (EE, P. 46). That is, according to Dewey, the ultimate value of learning anything is determined by the effect the subject matter has on an individual learner’s experiences. According to Rice (1996),

One aspect of attending to the quality of students’ experiences focuses on the students themselves, including their needs, capacities, interests, and purposes. There is no school subject or instructional method that is educative in itself; these acquire their educational significance only in relation to students. (p. 280)

For Dewey, educative experiences promote growth because educative experiences are ongoing acts of development “effected by the whole situation in which individuals are involved, in which they share and of which they are co-operative or interacting parts” (EE. p. 53).

Therefore, argues Dewey, growth is a process that is bound up with experience and is measured through an individual’s ability to expand and enrich his interaction with others, the environment,

and his own needs. In an educational context, growth is measured according to how well the entire experience of learning enriches the physical, moral, and intellectual development of the student that is learning.

**Play.** According to Dewey, growth comes from “a personal rather than an objective or intellectual” source (*SS*, p. 140). Growth begins in interest. “To be interested” Dewey argued, is to be absorbed in, wrapped up in, carried away by, some object. To take an interest is to be on the alert, to care about, to be attentive. We say of an interested person both that he has lost himself in some affair and that he has found himself in it. Both terms express the engrossment of the self in an object. (*DE*, p. 126)

At a very early age, children are supremely interested in play. Their interest in play, Dewey argued, is not aimless, but generally reflects a high level of concentration and concern for the imaginative work undertaken: “No one has ever watched a child intent in his play without being made aware of the complete merging of playfulness with seriousness” (*AE*, p. 291). Play, Dewey observed, is the initial stimulus towards educational development. While play can be spontaneous and whimsical, as students mature the same impulses that drive play can also be used to drive inquiry.

The first manifestations of play by a child do not differ much from those of a kitten. But as experience matures, activities are more and more regulated by an end to be attained; purpose becomes a thread that runs through a succession of acts; it converts them into a true series, a course of activity having a steady movement toward a goal. (*AE*, p. 290)

What interested Dewey about play was what play revealed about the relationship between experience and active intelligence. In the same way that inquiry arises out of an existential need to purposefully apply intelligence to precarious situations, an educative experience arises out of



the organic problems that arise in play. “Play and work” Dewey argues, “correspond, point for point, with the traits of the initial stages of knowing” (*DE*, p. 195). Play, like inquiry, is an active ordering of experience and a purposeful interaction with the materials and conditions of experience.

The point of these remarks is that play has an end in the sense of a directing idea which give point to the successive acts. Persons who play are not just doing something (pure physical movement); they are *trying* to do or effect something, an attitude that involves anticipatory forecasts which stimulate their present responses. (*DE*, p. 203)

According to Dewey, play, in an educational sense, is a natural type of experimentalism; it is an active and intelligent interaction between experience, intelligence, and the environment.

**Work.** For Dewey, meaningful work--like play--is a similar type of interaction between mind and environment and brings together both the empirical and theoretical aspects of thinking and learning. For Dewey, one of the tragedies of the industrial revolution was that work had become associated with drudgery.

Under unfree economic conditions, this state of affairs is bound to exist. Work or industry offers little to engage the motions and the imagination; it is a more or less mechanical series of strains. Only the hold which the completion of the work has upon a person will keep him going. (*DE*, p. 204)

In an educational context, Dewey believed that the way to differentiate the meaningful work of learning from the drudgery of learning was through an educational approach that harnessed the organic interests of play. According to Dewey, drudgery results from work and learning being “subordinated to external result” (*DE*, p. 204). Because work and learning are too often considered means to attain fixed ends irrespective of the interests, curiosities, and

experiences of students, the actual experiences of learning and working lack the personal investment and interest commonly found in play. For Dewey, the only difference that should exist between play and work is one of emphasis. For both to be truly meaningful, both should evolve out of and return to a student's interests and experience.

It is important not to confuse the psychological distinction between play and work with the economic distinction. Psychologically, the defining characteristic of play is not amusement nor aimlessness. It is the fact that the aim is thought of as more activity in the same line, without defining continuity of action in reference to results produced.

Activities as they grow more complicated gain added meaning by greater attention to specific results achieved. Thus they pass gradually into work. Both are equally free and intrinsically motivated...work which remains permeated with the play attitude is art—in quality if not in conventional design. (*DE*, p. 205-206)

In an educational setting, the ideal relationship between work and play is one that brings meaning to the experiences of the learner so that “each shall have had the education which enables him to see within his daily work all there is in it of large and human significance” (*SS*, p. 24). Dewey argued that educators have a responsibility to create a learning environment where students can safely explore and inquire across the domains of play and work:

It is the business of schools to set up the environment in which play and work shall be conducted with reference to facilitating desirable mental and moral growth. It is not enough to just introduce plays and games, hand work and manual exercises. Everything depends on the way in which they are employed. (*DE*, P. 196)

Dewey conceptualized the relationship between play and work as a relationship similar to an artist working within a particular medium. Like art, educative experiences occur “in and

through a medium...[through] a prolonged interaction of something issuing from the self with objective conditions, a process in which both of them acquire a form and order they did not at first possess" (*AE*, pp. 67-68). For Dewey, all that differentiates the work of the artist from the scientist is that the artist aims for expression while the scientist aims for explanation.

What is true of an artists is true of any other special calling. There is doubtless--in general accord with the principle of habit--a tendency for every distinctive vocation to become too dominate, too exclusive and absorbing in its specialized aspect. This means emphasis upon skill of technical method at the expense of meaning. Hence it is not the business of education to foster this tendency, but rather to safeguard against it, so that the scientific inquirer shall not be merely the scientist, the teacher merely the pedagogue, the clergyman merely one who wears the cloth, and so on. (*DE*, p. 308)

**Freedom and Democracy.** Furthermore, because growth also depends on both the character and habits of individuals who shape and are shaped by continual social interactions, Dewey believed that freedom and democracy are not just educational goals, they are *ways of being* through which educative experiences and growth are manifested.

It is not too much to say that an educational philosophy that professes to be based on the idea of freedom may become as dogmatic as ever was the traditional education which is reacted against. For any theory and set of practices is dogmatic which is not based upon critical examination of its own underlying principles. Let us say that the new education emphasizes the freedom of the learner. Very well. A problem is now set. What does freedom mean and what are the conditions under which it is capable of realization. (*EE*, p. 22)

According to Dewey, freedom of the learner, like freedom of inquiry, depends on an ability of the individual to *purposefully* grow. Purposeful growth is the ability of the individual to apply her intelligence to observation and experimentation for the solution of problems. In a strictly educational context, purposeful growth is dependent on the free and open relationship between the mature, the immature, and the play/work undertaken. The teacher, as the “mature guide,” is tasked with helping direct students towards educative experiences (*EE*, p. 58). Dewey also argued that schools, ideally, as institutions devoted to educative growth, were one of the main mechanisms whereby democracy *itself* was renewed.

Government, business, art, religion all social institutions have a meaning, a purpose. That purpose is to set free and to develop the capacities of human individuals without respect to race, sex, class or economic status. And this is all one with saying that the test of their value is the extent to which they educate every individual into the full stature of his possibility. Democracy has many meanings, but if it has a moral meaning, it is found in resolving that supreme test of all political institutions and industrial arrangements shall be the contribution they make to the all-around growth of every member in society. (*PR*, p. 107)

This renewal, however, was not through the passing down of specific principles of democracy, but through the function of the school *as* a democracy. That is, by cultivating habits and dispositions formed through expression of democratic freedoms, schools reinforced the practice of democracy. “Democracy is expressed in the attitudes of human beings and is measured by consequences produced in their lives” (*FC*, p. 97). As students grow through educative experiences, Dewey argued, the habits of inquiry and thinking support the continuation of democratic association; it becomes a way of life, not just a doctrine to be followed.

Furthermore, the very activity of learning itself depends on a free community of learners, in the same way that knowledge depends on a community of inquirers.

Thus, argued Dewey, in an educational setting it was important that work and play be free from the economic pressures found in industrial culture more broadly. While Dewey put great stock in a connection between learning that occurred at home and learning that took place in a school, he argued that the effectiveness of the school required a certain protection from the economic stratification that accompanied the economic realities of making a living. Work and play could only be “free and intrinsically motivated” if the “false economic conditions which tend to make play into idle excitement for the well to do, and work into ungenial labor for the poor” were eliminated (*DE*, pp. 205-206). The role of the teacher and the curriculum, Dewey argued, is to guide the impulses of play towards growth, towards meaningful work, in a free and democratically open environment.

### **Technological Arguments**

As discussed in chapter three, Dewey openly acknowledged and embraced the profound material progress of the industrial revolution. He believed that these gains had unleashed a torrent of creative energies, leading to huge advances in science, medicine, and better standards of living. However, as mentioned above, Dewey was also a central figure in the debates about the material and social costs of industrialization.

In an educational context, Dewey was concerned with how schools could ideally function as institutions capable of reflecting the reality of these industrial changes without devolving into a narrow vocationalism (Holt, 1994). “There are three things about the old-fashioned school which must be changed if schools are to reflect modern society: first, the subject-matter, second,

the way the teacher handles it, and third, the way the pupils handle it” (*ST*, p. 170). Across these three criteria, Dewey argued for a curriculum based on “occupations” (*SS*, p. 134).

An occupation, according to Dewey, is

...a concrete term for continuity. It includes the development of artistic capacity of any kind, of special scientific ability, of effective citizenship, as well as professional and business occupations, to say nothing of mechanical labor or engagement in gainful pursuits. (*DE*, p. 307)

Occupations are tasks associated with a specific type of job, as well as activities that “occupy” the attention of an individual or a group. Occupations are both an organizational unity of experience to “determine the consequences of associated activity” (*PP*, p. 44), and a type of attention that “puts the maximum of consciousness into whatever is done” (*SS*, p. 134). That is, whatever one is occupied with is that which captures and focuses one’s attention on a specific task and around which habits and inquiry are organized.

All people at the outset, and the majority of people probably all their lives, attain ordering of thought through ordering of action. Adults normally carry on some occupation, profession, pursuit; and this furnishes the continuous axis about which their knowledge, their beliefs, and their habits of reaching and testing conclusions are organized. (*HWT*, P. 41)

In an educational context, an occupation is “a mode of activity on the part of the child which reproduces, or runs parallel to, some form of work carried on in social life” (*SS*, p. 132). In the simplest explanation, occupations are educational projects involving a group of students in which the activities undertaken resemble activities found in homes and industry. In Dewey’s

time these activities were industrial in nature and included work like sewing, cooking, gardening, and farming.

A typical example of an occupational project is one Dewey gives in the *Schools of Tomorrow*. Dewey explains how this project extends across multiple subjects.

In the fifth grade, class activities were centered around a bungalow that the children were making. The boys in the class made the bungalow in their manual training hours. But before they started it every pupil had drawn a plan to scale of the house, and worked out, in their arithmetic period, the amount and cost of the lumber they would need, both for their own play bungalow and for a full sized one; they had done a large number of problems taken from the measurements for the house, such as finding the floor and wall areas and air space of each room, etc.

In English,

Work centered in much the same way around the building of the bungalow and the life of its inhabitants. The spelling lessons came from the words they were using in connection with the building, etc. The plans for the completed bungalow, a description of the house and the furnishings, or the life of the family that dwelt in it, furnished inexhaustible material for compositions and writing lessons.

And in art,

The pupils were very anxious that their house should be beautiful, so the color scheme for both the inside and outside furnished a number of problems in coloring and arrangement. Later they found large opportunities for design, in making wallpaper for the house, choosing and then decorating curtains and upholstery. Each pupil made his own design, and then the whole class decided which one they wanted to use. (pp. 75-77)

The “bungalow project” engaged and organized the students across an entire range of subject matter, from mathematics to art, with the focus of the academic subject matter being driven by the problems associated with the building and refinement of the bungalow itself.

Not only were the children “learning by doing” in the sense that nearly all the school work centered around activities which had intrinsic meaning and value to the pupils, but most of the initiative for the work came from the children themselves. They made their own number problems; suggested the next step in the work on the house; criticized each other’s compositions, and worked out their own dramatizations. (*ST*, p. 77)

Importantly, Dewey’s example of the bungalow project was not meant to advocate for a vocational training curriculum--the students building the bungalow were not learning how to build the house because they were eventually going to become construction workers; instead, the bungalow project engaged students in a process of inquiry whereby their personal experience with the work was organically bound to the purposes of the occupation.

Occupation as thus conceived must, therefore, be carefully distinguished from work which educates primarily for a trade. It differs because its end is in itself; in the growth that comes from the continual interplay of ideas and their embodiment in action, not in external utility. (*SS*, p. 133)

As such, the project was a vehicle for the discovery of subject matter linking the activities of real-world experiences with subject matter that organically arises out of the practices and interest of the occupation.

### **Instrumental Arguments**

The Bungalow project also reveals another important aspect of Dewey’s philosophy of education: education is more about learning *how* to think rather than *what* to think.



While it is not the business of education to prove every statement made, any more than to teach every possible item of information, it is its business to cultivate deep-seated and effective habits of discriminating tested beliefs from mere assertions, guesses, and opinions; to develop a lively, sincere, and open-minded preference for conclusions that are properly grounded, and to ingrain into the individual's working habits methods of inquiry and reasoning appropriate to the various problems that present themselves. (*HWT*, p. 28)

In a strictly instrumental sense, occupations are the organizing activity around which a problem is structured. Occupations are "...the conditions under which observation and inference take place"; they frame the set of immediate problems to be solved (*HWT*, p. 21). For example, if the occupation is cooking, then the immediate set of problems to be solved is what to cook, how long to cook it, what ratios to be used, etc. Occupations are also the foundation on which intellectual abstractions can be grounded. Recipes can spark lessons about addition and fractions, the choice of ingredients, principles of biology, etc.

The educative activities of childhood should be so arranged that direct interest in the activity and its outcome create a demand for attention to matters that have a more and more *indirect and remote* connection with the original activity. The direct interest in carpentering or shop work should yield organically and gradually an interest in geometric and mechanical problems. The interest in cooking should grow into an interest in chemical experimentation and the physiology and hygiene of bodily growth. (*HWT*, p. 141)

With the teacher as guide, Dewey believed that occupations allowed students the freedom to explore, play, and experiment with ideas, testing solutions against the realities and demands of the occupation itself.

The problem of the educator is to engage pupils in these activities in such ways that while manual skill and technical efficiency are gained and immediate satisfaction found in the work, together with preparation for later usefulness, these things shall be subordinated to *education*--that is, to intellectual results and the forming of socialized disposition. (*DE*, p. 197)

One criteria for “forming a socialized disposition,” argued Dewey, was a student’s ability to exercise self-control and mental discipline. By “training the mind” in the habits of active inquiry, Dewey believed that students could direct their intelligence towards purposes they freely choose.

Discipline means power at command: mastery of the resources available for carrying through the action undertaken. To know what one is to do and to move to do it promptly and by used of the requisite means is to be disciplined, whether we are thinking of an army or a mind. Discipline is positive. (*DE*, p. 129)

Furthermore, because learning through an occupation requires cooperation and collaboration, Dewey also argued that students learn that inquiry, conduct, and communication are frequently inseparable.

Schooling is a part of the work of education, but education in its full meaning includes all the influences that go to form the attitudes and dispositions (of desire as well as belief), which constitute dominate habits of mind and character. (*LSA*, p. 63)

For Dewey, the ability of a student to think beyond the immediacy of the moment and his own narrow interests is one of hallmarks of maturity and growth and a necessary step in the development of habits of active inquiry: “Only gradually and with a widening of the area of vision through a growth of social sympathies does thinking develop to include what lies beyond our *direct* interests: a fact of great significance for education” (*DE*, p. 148).

Finally, Dewey argued that as students learn *through* an occupation, they also learn *about* the occupation. For instance, when activities such as sewing or cooking are contextualized in an occupational learning environment they indirectly represent a long continuum of social and intellectual associations common to the needs of society and culture.

We must conceive of work in wood and metal, of weaving, sewing, and cooking, as methods of living and learning, not as distinct studies. We must conceive of them in their social significance, as types of the process by which society keeps itself going, as agencies for bringing home to the child some of the primal necessities of community life, and as ways in which these needs have been met by the growing insight and ingenuity of man; in short, as instrumentalities through which the school itself shall be made a genuine form of active community life, instead of a place set apart in which to learn lessons. (*SS*, p. 14)

Through an occupational curriculum, Dewey argued, students are both directly engaged in the process of learning, *and* they are indirectly engaged in a historical and geographical continuity of knowledge from which the occupation itself is formed.

Ultimately, Dewey’s philosophy of education, when considered across his developmental, technological, and instrumental arguments, is an approach to learning that is neither a complete break with a traditional curriculum nor a completely child-centric philosophy.

Instead, Dewey argued that education, as a form of inquiry, is a process of learning that occurs through an ongoing interaction with the world. A curriculum structured around occupations supports meaningful learning because it unifies the impulses of play within the context of work according to the methods of active inquiry. “The fundamental point,” argued Dewey, is that education through occupations “maintains a balance between the intellectual and the practical phases of experience” (*SS*, p. 133). Ideally, argued Dewey, the knowledge and habits students develop through an occupational curriculum helps students meaningfully grow across a variety of real-life empirical contexts. “With every ability to place our own doings in their time and space connections, our doings gain in significant content...our ordinary daily experiences cease to be things of the moment and gain enduring substance” (*DE*, p. 209).

### **Criticisms**

The criticisms of Dewey’s growth-centric occupational curriculum resemble many of those lodged against his philosophy of knowledge and his philosophy of technology. On the one hand are the arguments that accuse Dewey of undermining the virtues of a traditional curriculum in favor of a vague and unarticulated concept of “growth”; on the other hand are the critical theorists who argue that Dewey’s curriculum is too narrowly conceived.

#### **Traditional Arguments**

Detractors arguing from the traditionalist line accuse Dewey, and progressivism more generally, of undermining traditional values and watering down the curriculum. Early on, this line of argument was championed by the one-time Chancellor of the University of Chicago, Maynard Hutchins (1936), and Mortimer Adler (1940), one of Dewey’s ex-students. Hutchins (1936) and Adler (1940) both openly criticized Dewey across numerous writings, accusing Dewey of ignoring the virtues of classical learning in favor of a relativistic scientific curriculum.

Mortimer Adler (1940) went so far as to pejoratively refer to American public schools as being “Deweyized” (Shea, 1989, p. 297).

Hutchins (1936) and Adler (1940) were co-founders of the Great Books of the Western World program, which favored a curriculum based on carefully chosen texts meant to evoke and preserve the historical virtues of the western world.

Their vision was a simple prescription for a nation increasingly interested in the role of higher and continuing education in a democracy: The best way to gain a liberal education in or out of the university, they argued, is to discuss the writings of the world’s great thinkers. (“A Brief history”, n.d.)

This vision, in many ways, echoed some of the same critiques of the realist traditions, arguing that “the difficulty with Dewey's position in this matter...is that it leaves one with nothing to believe in and live by that is permanent, nothing that one can say ‘true’” (Shea, 1989, p. 303).

Richard Hofstadter’s (1963) book *Anti-intellectualism in American Life* is in many ways an extension of the Hutchins-Adler critique. According to Hofstadter (1963), Dewey was one of the main progenitors of the “new education” movement and therefore bore much of the responsibility for “dissolving the curriculum” and promoting an anti-intellectual agenda in education (p. 360). While Hofstadter (1963) is quick to point out that Dewey himself was not an anti-intellectual, he argued strongly that the heritage of Dewey’s progressive views, specifically his linking of educational ends with growth, led to a wide spread ethos of educational anti-authoritarianism in which the intellectual traditions of the past are cavalierly cast aside in favor of the developmental priorities of the individual.

According to Hofstadter (1963), the over-emphasis on growth, alongside vague articulations of specific curricular goals, made it,

difficult to discover from his major works on education what he thought a good curriculum should be, or rather what the various alternative curricula should be, in the American school system. This absence of curricular commitments was consistent with his proposition that no ends or goals should be formulated for education, since its only legitimate end is the capacity for further education. (p. 375)

Hofstadter (1963) found this later conclusion particularly troubling, not because he objected to the idea of growth, but because the “concept of individual growth became hostage in the hands of educational thinkers who were obsessed with the child-centered school” (p. 374). That growth lacked curricular focus, and that it had become an idea embraced by child-centered advocates, led Hofstadter (1963) to believe that “the effect of Dewey’s philosophy on the design of curricular systems was devastating” (p. 377).

The “devastation” Hofstadter (1963) accused Dewey of wreaking was to generate a wholesale implosion of the traditional curriculum in favor of crass individualism and a bias for social goods over and above intellectual ones. Ultimately, Hofstadter (1963) argued, Dewey helped inspire a tradition in American schooling that denigrated the past as woefully ignorant and enslaving.

Having once put the child so firmly at the center, having defined education as growth without end, Dewey had so weighted the discussion of educational goals that a quarter century of clarificatory statements did not avail to hold in check the anti-intellectual perversions of his theory. (p. 389)

Dewey’s response to these traditionalist critiques was to argue that certain curricular philosophies (e.g., Hutchins’) were misguided because they smacked of authoritarianism and assumed an irreconcilable binary between a classical curriculum and a contemporary empirical

one. As with his critiques of the Western philosophical tradition, Dewey (1937) suggested that it was possible to have curriculum devoted to both streams:

The cure for surrender of higher learning to immediate and transitory pressures is not monastic seclusion. Higher learning can become intellectually vital only by coming to that close grip with our contemporary science and contemporary social affairs which Plato, Aristotle, and St. Thomas exemplify in their respective ways. (p. 104)

Furthermore, argued Dewey (1937), any intimation that he was seeking to replace traditional disciplinary knowledge with a narrow vocational or manual training regime was to misunderstand his objectives. As demonstrated above, for Dewey, an occupational curriculum was a platform for an endless variety of possible ends and for a deepening of subject matter, not a critique of past knowledge or texts.

Enlargement of intellectual horizon, and awakening to the multitude of interesting problems presented by contemporary conditions, are the surest guarantees for good use of time with books and magazines. When books are made an end in themselves, only a small and highly specialized class will devote themselves to really serviceable books. When there is a lively sense of the interest of social affairs, all who possess the sense will turn as naturally to the books which foster that interest as to the other things of which they feel a need. (*ST*, p. 244)

Dewey's (1937) response to Hutchins' specifically, and to traditionalists more generally, was that any insistence on a codified curriculum that isolated itself from the concerns of contemporary society smacked of foundationalism and assumed an epistemological stance dependent more on acquiesce to authority than to methods of demonstrable consequence:

There are indications that Mr. Hutchins would not take kindly to labelling the other phase of this remedial plan “authoritarian.” But any scheme based on the existence of ultimate first principles, with their dependent hierarchy of subsidiary principles, does not escape authoritarianism by calling the principles “truths.” I would not intimate that the author has any sympathy with fascism. But basically his idea as to the proper course to be taken is akin to the distrust of freedom and the consequent appeal to some fixed authority that is now overrunning the world. (p.103)

And while Dewey’s (1937) responses to Hutchins were directed at the curriculum of higher education, it is clear across numerous writings that Dewey’s curricular philosophy, regardless of academic level or context, was not to be taken as a repudiation of traditional subjects. Rather, Dewey argued that subject matter is meaningful insofar as it is *used*, not as an end itself.

### **Critical Arguments**

The other line of criticism that is frequently lodged against Dewey is also an indictment of Dewey’s open-ended curriculum. More charitably, these critiques accept the developmental approach espoused by Dewey, especially when development is linked to individual and collective autonomy, but they charge Dewey’s curricular philosophy with being incapable of truly delivering such freedom in the absence of an institutional desire to attain such ends.

Among Dewey’s contemporaries, George Counts’s (1978) *Dare the Schools Build a New Social Order* is perhaps most representative of these early critical charges. While Counts (1978) had a good deal of sympathy for Dewey’s overall approach, Counts (1978) considered Dewey’s industrial and educational liberalism a form of acquiescence to the very institutions that made true freedom impossible.



Even a casual examination of the program and philosophy of the progressive schools, however, raises many doubts in the mind. To be sure, these schools have a number of large achievements to their credit. They have focused attention squarely on the child; they have recognized the fundamental importance of the interest of the learner; they have defended the thesis that activity lies at the root of all true education; they have conceived learning in terms of life situations and growth of character; they have championed the rights of the child as a free personality. Most of this is excellent, but in my judgement it is not enough. It constitutes too narrow a conception of the meaning of education; it brings into the picture but one-half of the landscape. (pp. 5-6)

What concerned Counts (1978), and other critical theorists since Counts (1978), was Dewey's belief in the power of the education system to promote democratic norms without also directing the resources of schools towards a specific critique of the capitalist system. How, they asked "could schools that were an expression of industrial capitalism create an educational regime that would radically change and even subvert industrial capitalism?" (Cohen, 1998, p. 438). Counts (1978) argued that unless schools were purposefully devoted to a critique of the status quo, the aims of growth could only support the interests of the powerful. "My thesis," argues Counts, (1978) "is that complete impartiality is utterly impossible, that the school must shape attitude, develop tastes, and even impose ideas" (p.19).

The critical call to "build a new social order" via a "critical consciousness" is not entirely outside the purview of Dewey's own curricular goals, but as is true of his response to the traditionalist critique, Dewey did not endorse a curriculum whose ends were predetermined (Counts, 1978; Freire, 1968). Dewey did, however, come to recognize that schools alone could not change the social order:

It is unrealistic, in my opinion, that the schools can be a *main* agency in producing the intellectual and moral changes, the changes in attitudes and disposition of thought and purpose which are necessary for the creation of a new social order. Any such view ignores the constant operation of powerful forces outside the school which shape mind and character. It ignores the fact that school education is but one educational agency out of many, and at the best is in some respects a minor educational force. (LW:11, p. 414)

Yet, while Dewey agreed that schools, alone, could not create a more democratic union, he did not lose faith in the power of schools to shape individual judgment.

Our public school system was founded in the name of equality of opportunity for all, independent of birth, economic status, race, creed, or color. The school can not by itself alone create or embody this idea. But the least it can do is to create individuals who understand the concrete meaning of the idea with their minds, who cherish it warmly in their hearts, and who are equipped to battle in its behalf in their actions. (LW:11, p. 416)

Thus, in so far as Dewey argued for an emancipatory theory of education that relied on his pragmatically instrumentalist assumptions about the uses of knowledge and technology in education, he and the critical theorists can find some common cause--both argue that free and open inquiry is foundational to educational practice. Where they differ is in their faith in human judgment and in human technologies to collectively unchain itself from the institutional, political, and economic ideologies that guide educational development. Critical theorists argue that schools should be used to assist in the creation of a more equitable social order through a direct response to the ideologies that reproduce sorting and social inequality; Dewey argued that educational value is ultimately determined through the habits and dispositions of individuals. Each recognized the importance of the individual student and the union of curriculum and

experience, but each places the power of social change in different locations. For Counts (1932), and later critical theorists like Apple (1978) and Giroux (1997), social change requires the redirection of institutional goals through a curriculum that challenges the critical consciousness of students; for Dewey, such power resides in individual judgment trained according to epistemological frames aimed at growth and inquiry. Dewey believed in the ability of an occupational curriculum to cultivate the habits of active inquiry because it required the free and collaborative efforts of the entire institution to ensure that inquiry proceeded along instrumental lines. He did not ignore the influence of economics and inequality, but he believed that their correction would occur through cultivating the habits and dispositions of open inquiry, not through a curriculum devoted specifically to social critique.

### **Conclusion**

Dewey's belief in education through occupations brings together his philosophy of knowledge, his philosophy of technology, and his philosophy of education. Like the process of inquiry and the production of knowledge, Dewey's philosophy of education is not an attempt to prescribe an exact end for curriculum, nor does it demand a defined set of standards; it is an attempt to construct a curricular framework whereby the moral and intellectual development of students is directly linked to real-world experiences. According to Dewey, the foundational aim of a curriculum is to promote growth in the learner through educative experiences. Learning is a process through which individuals and communities deepen and enrich their understanding of themselves and the world around them through interaction and experimentation in an educational setting.

Like his philosophy of technology, Dewey's occupational curriculum emphasized the importance of technological relations to the conditions of experience by encouraging students to

purposefully interact with and understand the technological world in which they live. Education through occupations brings together communities of learners to solve problems that emerge from the relationship between the learner, the technologies, and the purposes to which the technologies are geared. The technologies in this sense are neither determinative of the process of inquiry nor are they value-neutral. As students employ and interact within an occupation they both employ and reflect on the technology. Furthermore, as the empirical ground of educative experience, students extract meaning across both the immediate experience of using the tools as well as through an understanding of the historical, geographical, and sociological lineage of the technology itself.

Like his epistemology, Dewey's occupational curriculum argued for a continuum between the practical and the theoretical. The function of an occupational curriculum is to deepen experience by harnessing the natural interests of immature students within a hands-on environment to develop habits of instrumental inquiry. An occupational curriculum is both a technological and humanistic curriculum that uses the revelatory power of engineering and scientific progress, while also contextualizing that progress within specific human experiences; the value of the knowledge gained through the technology is measured against the meaning to actual students existing within specific social contexts. "No other method," argued Dewey, is to be found unless it be constantly borne in mind that the educational center of gravity is in the cultural or humane aspects of the subject. From this center, any material becomes relevant in so far as it is needed to help appreciate the significance of human activities and relations. (*DE*, p. 212)

What emerges from Dewey's occupational curriculum, therefore, is an approach to education in which the developmental and the technical are continually interacting to produce

growth. The interaction between the student, the teacher, and the learning environment is one in which the technology neither determines nor disappears from the process of growth. Instead, the technologies are understood as helping to organize the conditions of the inquiry and, when successful, being fully exposed in doing so. That is, an occupational curriculum uses technology to shape educative experiences while also eliciting an awareness of the role of technology in the process of inquiry itself.

The problem here is then (1) to furnish the child with a sufficiently large amount of personal activity with occupations, expression, conversation, construction, and experimentation... and (2) so to conduct this more direct experience as to...furnish him with motives and make his recourse to them intelligent, an addition to his powers, instead of servile dependency. (SS, p. 113)

The goal, then, of an occupational curriculum is to empower the student to command his resources (technological or otherwise), both intellectually and concretely, so that he may freely pursue experiences and interactions that deepen and enrich the meaning of his life through whatever activities he purposefully chooses.

## Chapter 5 PI in Contemporary Contexts

In this chapter I will argue that the interpretation of Dewey's pragmatic instrumentalism I have presented in the previous three chapters has practical and philosophical significance in respect to modern digital technologies in contemporary educational contexts. By modern digital technologies I am referring to those technologies that have evolved out of the recent convergence of the computer, mobile devices, and the internet. Henceforth, I will refer to these technologies as "information and communication technologies" (ICTs). This chapter will argue that a pragmatic instrumentalist approach to ICTs, much like a PI approach to industrial technologies, involves reflecting on the relationship between knowledge, technology, and education. Ultimately, I will argue that a PI approach to educational technologies challenges educators, students, and policy makers to *accept responsibility* for the use of ICTs as both an object and an expression of purposeful inquiry.

As I have tried to demonstrate throughout this dissertation, Dewey argued across his career that the transformative realities of the industrial revolution clearly demonstrated the power of the scientific method to solve practical and material problems of living. Dewey also argued that pragmatic instrumentalism could help frame and solve social problems of associative living and education by acknowledging and accepting the logic of the scientific method as the basis of purposeful intelligence. Thinking, Dewey argued, is a deliberate act of using the material, technological and social conditions of the world to enrich human experience. "The enemy" argued Dewey, "is not material commodities, but the lack of will to use them as instruments for achieving preferred possibilities" (*ION*, p. 76). I am arguing that in the same way Dewey considered PI a useful theory for approaching educational problems arising out of the industrial

world, PI can also be used as a method to frame and explore many of the educational problems arising out of the ICT world.

My argument presupposes that there is a significant and unique change occurring in education because of ICTs. I will argue that one of the central characteristics delineating ICTs from their industrial predecessors is the way ICTs are changing the formation and distribution of information. I will then explore what it means, from a PI perspective, for educators, students, and policy makers to accept responsibility for the use of ICTs in educational contexts.

### **Industrial and Digital Revolutions**

There are many similarities between the modern digital revolution and the industrial revolution of Dewey's time. According to Isaacson (2014), "just as the industrial revolution was driven by combining the steam engine with ingenious machinery, the Digital Revolution has been driven by two great innovations: the personal computer and the internet" (par. 1).

According to Moor (1983),

The essence of the Computer Revolution is found in the nature of the computer itself.

What is revolutionary about computers is *logical malleability*. Computers are logically malleable in that they can be shaped and molded to do any activity that can be characterized in terms of inputs, outputs, and connecting logical operations...the logic of the computer can be massaged and shaped in endless ways through changes in hardware and software. Just as the power of the steam engine was a raw resource of the Industrial Revolution so the logic of the computer is a raw resource of the Computer Revolution.

(Italics Moor, p. 269)

Negroponte (1995) argues that the difference between the Industrial Revolution and the Digital Revolution can be characterized by the difference between atoms and bits:

The industrial age, very much an age of atoms, gave us the concept of mass production, with economies that come from manufacturing with uniform and repetitious methods in any one given space and time. The information age, the age of computers, showed us the same economies of scale, but with less regard for space and time. The manufacturing of bits could happen anywhere, at anytime.... (p. 163)

A bit, argues Negroponte (1995), “has no color, size, or weight, and it can travel at the speed of light. It is the smallest atomic element in the DNA of information. It is in a state of being on or off, true or false, up or down, in or out, black or white” (p. 15). The bit has made possible the exponential growth of the internet and mobile technologies, instantaneous visual and auditory communication, unlimited access to information, unfathomable processing power of vast amounts of data, unlimited recording capacity, and seamless interconnectivity between devices.

ICTs are now almost everywhere. According to the US Census Bureau (2012), between 1984 and 2012, the percentage of homes with a computer grew by 70.7%. Between 1997 and 2012, the percentage of homes that had internet access grew by 56.8%. Since 2016, 9 in 10 Americans are online, 77% own a smart phone, 73% have broadband internet at home, 51% own a tablet, and 69% of American adults use social networking sites (Smith, 2017; Perrin, 2015). Between 2011-2013, nearly one-third of all Americans used three or more devices to connect to the internet (Morris, 2016). Cisco Systems, the largest provider of IP services in the world, predicts that IP internet traffic will triple to 2.3 zettabytes by 2020 (Cisco, 2016). To put that in perspective, 1 zettabyte is equivalent to all the information that can be stored on 250 billion DVDs (Arthur, 2011).



## **Infospheres and Inforgs**

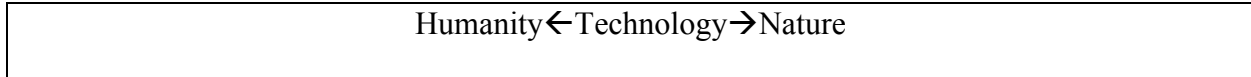
One way to think more deeply about the unique characteristics of the digital revolution is through the work of philosopher Luciano Floridi (2015). Floridi's (2015) ideas offer a contemporary and comprehensive account of how many in philosophy of technology think about ICTs. According to Floridi (2015) what clearly distinguishes ICTs from industrial technologies is the way ICTs enable the widespread manipulation and communication of information across lexicographical, visual, and auditory domains.

In his book *The Fourth Revolution*, Floridi (2015) argues that we are currently living in an age of "hyperhistory" (p. 4). To live hyperhistorically is to live "in societies and environments where ICTs and their data-processing capabilities are not just important but essential conditions for the maintenance and any further development of societal welfare, personal well-being, and overall flourishing" (Floridi, 2015, p. 4). According to Floridi (2015), "hyperhistory is a new era in human development" characterized by the relationship between individuals and the "infosphere" (p. 22). Floridi (2015) defines the infosphere as

...the whole informational environment constituted by all informational entities, their properties, interactions, processes, and mutual relations. It is an environment comparable to, but different from, cyberspace, which is only one of its sub-regions, as it were, since the infosphere also includes offline and analogue spaces of information. Maximally, the infosphere is a concept that can also be used as synonymous with reality, once we interpret the latter informationally. In this case, the suggestion is that what is real is informational and what is informational is real. (p. 40)

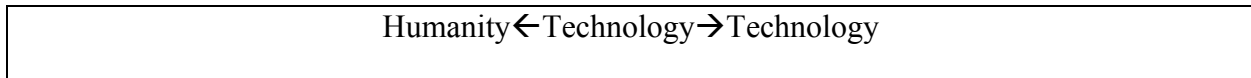
According to Floridi (2015), the infosphere is comprised of first, second, and third order technologies. First-order technologies are technologies that mediate the relationship between a

user and nature (see Figure 2). A typical example of a first order technology is an ax, or a knife.



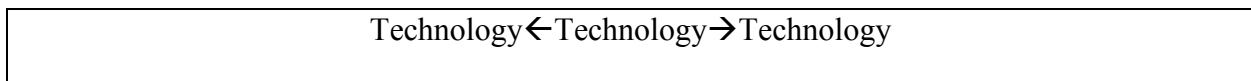
*Figure 2.* First-order Technology

Second-order technologies are those technologies that mediate between the user and other technologies (see Figure 3). For instance, a screw driver mediates between the user and another technology, the screw.



*Figure 3.* Second-order Technology.

Third order technologies are those technologies that mediate between themselves, with minimal or no need of a user (see Figure 4).



*Figure 4.* Third-order Technology.

Sometimes referred to as the “internet of things” third-order technologies,

are about removing us, the cumbersome human in-betweeners, off the loop. In a defragmented and fully integrated infosphere, the invisible coordination between devices will be as seamless as the way in which your smartphone interacts with your laptop and the latter interacts with the printer. (Floridi, 2015, p. 30)

According to Floridi (2015), like the first scientific revolution in which Copernicus discovered that the earth was not the center of the universe, the second revolution in which Darwin discovered that humans are not separate from the rest of the animal world, and the third revolution in which Freud discovered that conscious thought is not the center of human behavior, the fourth revolution (via Alan Turing) has demonstrated that we are no longer the center of our own information:

Turing displaced us from our privileged and unique position in the realm of logical reasoning, information processing, and smart behavior. We are no longer the undisputed masters of the infosphere. Our digital devices carry out more and more tasks that would require some thinking from us if we were in charge. We have been forced to abandon once again a position that we thought was “unique.” (p. 92)

As information organisms (“inforgs”) within an infosphere, Floridi (2015) argues, we are quickly becoming organisms for whom life online and life offline will cease to exist (p. 94).

We will come to recognize no fundamental difference between the infosphere and the physical world, only a change in perspective. When the migration is complete, my guess is that Generation Z will increasingly feel deprived, excluded, handicapped, or poor to the point of paralysis and psychological trauma whenever it is disconnected from the infosphere, like fish out of water. One day, being an inforg will be so natural that any disruption in our normal flow of information will make us sick. (p. 97)

Ultimately, argues Floridi (2007), ICT technologies are “re-ontologizing” the world:

Re-ontologizing is another neologism that I have recently introduced in order to refer to a very radical form of re-engineering, one that not only designs, constructs or structures a system (e.g. a company, a machine or some artefact) anew, but that fundamentally transforms its intrinsic nature. (p. 5)

One implication of digital re-ontologizing is that “it will become progressively less credible to claim ignorance when confronted by easily predictable events” (Floridi, 2007, p. 5). That is, to be uninformed will soon be considered, if it is not already, an act of willful disregard because “the re-ontologization of the infosphere, will be the disclosure of human agents as interconnected, informational organisms among other informational organisms and agents”

(Floridi 2015, p. 10). According to Floridi (2015), because interconnectivity will touch on every aspect of a person's life, to be uninformed will be considered an act of irresponsibility not of ignorance.

### **Digital Natives and Digital Immigrants**

In an educationally specific sense, an extension of Floridi's (2015) ideas are similarly expressed in the ideas of Marc Prensky (2001). According to Prensky (2001a), people born into a fully digital world grow up with a different relationship to ICTs than those born before the digital revolution. Those born into a digital world, argues Prensky (2001a), are what he calls "digital natives" (p. 2). A digital native is a "native speak[er] of the digital language of computers, video games and the Internet" (p. 2). They are, argues Prensky (2001a),

...used to receiving information really fast. They like to parallel process and multi-task.

They prefer their graphics before their text rather than the opposite. They prefer random access (like hypertext). They function best when networked. They thrive on instant gratification and frequent rewards. They prefer games to 'serious' work. (pp. 2-3)

Conversely, argues Prensky (2001a), those born before the digital revolution are what he calls "digital immigrants" (p. 3).

According to Prensky (2001a) the difference between digital natives (students) and the digital immigrants (teachers) is a significant problem in educational contexts. Specifically, argues Prensky (2001b), even though digital immigrants have been forced to adapt to the digital world they invariably retain some of their "accent" from their native, non-digital land (p. 3):

The "digital immigrant accent" can be seen in such things as turning to the Internet for information second rather than first, or in reading the manual for a program rather than assuming that the program itself will teach us to use it. Today's older folk were

“socialized” differently from their kids, and are now in the process of learning a new language. And a language learned later in life, scientists tell us, goes into a different part of the brain. (p.3)

Problems arise between digital natives and digital immigrants when the behaviors and thinking patterns of the immigrants, who are primarily teachers, use an “outdated language...to teach a population that speaks an entirely new language” (p. 3).

According to Bennett, Matton & Kervin (2008), “the debate over digital natives is thus based on two key claims: (1) that a distinct generation of ‘digital natives’ exists; and (2) that education must fundamentally change to meet the needs of these ‘digital natives’” (p. 777). Like many other cultural, social, and generational differences that affect educational practices, Prensky (2001a) is arguing that the ubiquity of digital technologies creates a kind of translation problem between natives and immigrants. As with other translational problems, the immigrant (the older generation) is out of touch with the native (the younger generation), and the “language” difference creates a problem regarding how effective teachers can be without the ability to “talk” the language of the student.

Critics of Prensky (2001a) (see Bennett, Matton & Kervin, 2008; Selwyn, 2009; Brown & Czerniewicz, 2010) have argued, rightly I think, that the digital native/digital immigrant argument is hardly unique to ICTs, and that evidence for the division between immigrants and natives is not as acute as Prensky (2001a) argues. There are, for instance, many ways that the difference between one social group and another affect the learning process, just as there is a lot of variation in ICT use based upon grade-level, socio-economic status, and cultural norms. For these reasons, and more, it is difficult to generalize ICT use.

My intent here is not to defend Prensky (2001a) or Floridi (2015) as the only ways to

consider the impact of ICTs on information gathering and educational practices. I simply want to suggest that both Floridi (2015) and Prensky (2001a) are representative of broader epistemological claims that ICTs, like industrial technologies before them, have become so ubiquitous and ingrained in contemporary life that it is important to individually and collectively reflect on how ICTs are or are not affecting educational practices and aims.

At a minimum, it is becoming increasingly difficult to dispute that ICTs play a role in the way students process and interact with information. For instance, as of 2013, 93% of teens own or have access to a computer at home, 78% own a cell phone, and 23% own a tablet computer (Madden, et al. 2013). In 2015, 66% of children ages 3-14 and 85% of young adults ages 15-24 use the internet (Morris, 2016). 92% percent of teens report going online daily and 56% go online several times a day (Madden, et al. 2013).

In schools the use of ICTs has also increased. For example, between 1999 and 2012 the number of computers in schools per square foot grew by 71% (US Energy Information Administration, 2016). 77% of all students in America have access to the internet, 28.4% of college students have taken at least one online course, 88% of school districts have broadband access to the internet, and 83% report having sufficient Wi-Fi (Allen, Seaman, Poulin & Struat, 2016; EducationSuperHighway, 2016). In 2013, 46% of district administrators “identified the effective implementation of technology tools (such as online learning, digital content and mobile devices) as having the greatest potential to impact student outcomes for college and career readiness” (Project Tomorrow, 2013, p. 2). 74% of teachers believe mobile devices increase student achievement in schools for grades 6-12, 48% of teachers have used online videos, 27% have used digital textbooks, 9% have used virtual labs, and 18% have used digital technology to gather real time data (Project Tomorrow, 2013).

As ICT use in schools increases, the learning environment itself is also being restructured (O’Rielly, 2005; Kucirkova, 2014). For example, technologies like cloud computing and what is referred to as Web 2.0 (see Figure 5) allows students, teachers, and administrators to upload any type of multimedia document to a central hub accessible to anyone on the network at any time, from inside the school or out, on any type of device. Online learning platforms like Blackboard and Google Classroom allow students, teachers, and administrators to engage in discussion boards, view multimedia materials, and conduct entire classes completely online. Computer and mobile applications (apps) such as Evernote, Duolingo, and Math Game offer an endless variety of education specific tools to assist students, teachers, and administrators with everything from organizing notes, learning languages, to learning math skills.



Figure 5. A typology of Web 2.0 learning technologies, Bower, M. (2015).

All of these changes, according to Lankshear, Peters & Nobel (2002), suggest that

The circumstances, conditions and the very status of knowledge, learning, teaching and researching are currently in a state of profound upheaval under the double impact of rapid and far-reaching technological change and the massive assault on longstanding narratives of foundation and legitimation. (pp.17-18)

### **Accepting Responsibility**

If one accepts that ICTs are becoming a significant factor in the way that individuals and students relate to the world, as Floridi (2015) and Prensky (2001a) suggest, then it is important from a PI perspective to also consider the implication of how and if ICTs affect the way educators, students, and policy makers relate to the aims of education. In *Rethinking Education in the Age of Technology*, Halverson & Smith (2009) argue that there are two general approaches regarding how we think about ICTs and educational aims: technological enthusiasm and technological skepticism. Technological enthusiasts argue that educators should embrace technology's "enhanced capabilities" to reshape education because "the world is changing and we will need to adapt schooling to prepare for the changing world [students] enter" (p.9). Technological skeptics argue that ICTs carry "the risk of either reducing the rich variety of classroom teaching and learning to the most predictable forms of rote learning or perverting the learning experience in the interests of commercial media" (p.30).

I would like to suggest that a PI approach to ICTs provides a middle ground between the enthusiast and the skeptic. PI suggests we consider ICTs in education according to two interrelated points: one, that the educational aims of technology evolve out of the needs of individual and collective inquiry rather than out of a desire to achieve predetermined fixed ends; and two, that educators, students, and policy makers are ultimately *responsible* for how and why educational technologies are used.



## **Technological Skepticism: ICTs, Standards, and Fixed-Ends**

Technological skeptics argue that ICTs are being used to pressure schools into providing a “constant production of ‘evidence’ that people within schools are doing things ‘efficiently’ and in the ‘correct’ manner” (Selwyn, 2011, p. 484). Often, critics argue, “evidence” takes the form of data collection and high stakes testing, which according to Nichols & Berliner (2008) “is the practice of attaching importance to standardized test scores...[wherein] the promise of rewards and the threat of punishment will cause teachers to work more effectively” (p. 672). According to Apple (2005), when assisted by developing technology, evidence gathering is one of the hallmarks of an “audit culture” in which “the widespread nature of these evaluative and measurement pressures, and their ability to become parts of our common sense, crowd out other conceptions of effectiveness and democracy” (Apple, 2005, pp. 14-15; Apple, 2007). Because ICTs are able to easily and efficiently process and communicate vast quantities of information and data, critics of the standards movement often argue that digital technologies are primarily used to support the argument “that the availability of data will inform and initiate improvements in educational practice” (Wayman & Stringfield, 2006, p. 549). For Apple (2005) and other critics, the ICTs empowered standards movement represents a commodification of education in which the value of educational aims are becoming more and more defined according to economic metrics.

For instance, according to The Partnership for 21<sup>st</sup> Century Skills (2008), the leading advocate for the adoption of 21<sup>st</sup> Century Skills curriculum in schools, “every aspect of our education system—preK-12, post-secondary and adult education, after school and youth development, workforce development and training, and teacher preparation programs—must be aligned to prepare citizens with the 21<sup>st</sup> century skills they need to compete” (p. 1). Skills like

“thinking critically and making judgements,” “solving complex, multidisciplinary, open-ended problems,” “making innovative use of knowledge, information and opportunities,” and “communicating and collaborating,” are presented as central to success in working with ICT technology and ultimately ensuring success in “college, work, and life” (p. 12). Arguing that “this is a seminal moment in history for education and competitiveness” where “formalizing the connection between education and competitiveness...is the central...challenge of the next decade” the Partnership for 21<sup>st</sup> Century Skills (2008) argues that the measure of educational success depends on how well students master technological skills to achieve economic success (p. 16).

Like administrative progressives before them and the debates over social efficiency, technological skeptics argue that ICT “technologies for learning” frequently reflect what Selwyn (2011) calls “institutional technologies”:

far from being a source of enabling “bottom-up” change, these institutional technologies appear to be entwined in a multiplicity of “top down” relationships related to the concerns of school management and administration. It could be argued that the use of these systems is shaped more often by concerns of institutional efficiency, modernization and rationalization, rather than the individual concerns of learners or teachers. (p. 484)

According to Diane Ravitch (2009),

there is nothing new in the proposals of the 21st century skills movement. The same ideas were iterated and reiterated by pedagogues across the twentieth century. Their call for 20th century skills sounds identical to the current effort to promote 21st century skills.

(Ravitch, 2009, n.p.)

Wayne Au (2011) argues that the combination of new technologies with the imperatives of the standards movement represents a return to Taylorism: “public school teachers in the US are teaching under what might be considered the ‘New Taylorism,’ where the labor is controlled vi-a-vis high stakes testing and pre-packaged, corporate curricula aimed specifically at teaching to the test” (p. 25). Much like the “old Taylorism,” the New Taylorism reflects a pervasive managerialism (“new managerialism”) in which the auditing powers of ICTs favors centralized efficiencies of measurement and standardization (Selwyn, 2011, p. 479). Apple (2007) contends that these technologies have resulted not in “the promised de-centralization that plays such a significant role rhetorically in most neo-liberal self-understandings, but what seems to be a massive re-centralization and what is best seen as a process of de-democratization” (p. 15).

As I have discussed throughout this dissertation, Dewey clearly expressed a similar worry that technological progress could be used to undermine democracy and educational aims directed at growth. However, what distinguishes a PI approach to technology is that Dewey did not argue that the technology itself was to blame. For Dewey, there is nothing inherently wrong with using technology to guide or measure achievement. Furthermore, not all technologies for “learning” necessarily promote specific fixed standards. ICTs can be used for a whole assortment of institutional reasons that have little or nothing to do with academic or intellectual aims such as the organization of grading, class rosters, class schedules, etc. What a PI approach to learning *does* reject is the idea that meeting abstract and fixed standards is the ultimate measure of educational value.

From a PI perspective, when the learner and the process of learning are conceptualized as having separate ends—especially if one end is considered more valuable than another—then a false dualism is created in which the separation of learner and learned perpetuates an artificial

division between the meaningful growth of an individual and the content being studied. “The problem of education in a democratic society is to do away with the dualism and to construct a course of studies which makes thought a guide of free practice...” (DE, p. 263). For instance, if the 21<sup>st</sup> century skills curriculum is contextualized as a codified curriculum solely devoted to teaching exact skills regardless of the context and students to which it is introduced, then it is true that in most instances the curriculum could represent a too narrow focus from a PI perspective. But, it is not the curriculum itself that a PI approach would reject; rather, it is that the projected ends are considered fixed and totally independent of the needs and interests of individual learners. There is nothing wrong with learning specific skills or directing curriculum towards specific ends, as long as the ends themselves are understood as temporary as they relate to particular learners. It is learners that ultimately decide and judge what ends are valuable to them because those ends bring meaning to their experiences as they exist within a community of others.

The purposeful use of any technology, therefore, in a PI sense, means using the technology in a deliberate and intelligent way towards ends that solve problems and bring meaning to the lives of learners within a community of learners. As Dewey argues,

No classification, no selection and arrangement of facts, which is consciously worked out for purely abstract ends, can ever compare in solidity or effectiveness with that knit under the stress of an occupation; in comparison the former sort is formal, superficial, cold.

(DE, p. 310)

In other words, it matters *why* individual learners pursue specific ends, not that there *are* specific ends to pursue.

## **Technological Optimism: Determinism and Hype Cycles.**

There is a related point to be made when further considering the implications of a PI approach to ICTs as “tools of learning” (Halverson & Smith, 2009, p. 49). Specifically, PI challenges educators, students, and policy makers to consider how the rhetoric of technological optimism can often be indistinguishable from arguments for technological determinism. A good example of this blurred line is illustrated in the rise and fall of MOOCs.

MOOCs, or Massive Open Online Classes, began in 2011 when Stanford Professor Sebastian Thrun and computer scientists David Stavens and Michael Sokolsky started the online learning company Udacity. Inspired by the popularity of Thrun’s online artificial intelligence course at Stanford, Udacity sought to revolutionize the world of higher education by offering access to university classes completely online and, often, for free. Not long after Udacity started, similar companies like Coursera and EdX, a non-profit online partnership between Harvard and MIT, began offering Ivy league classes online for credit. In 2012, EdX enrolled over 370,000 students in one of its first online courses. In Coursera’s first five months, they enrolled 1.3 million students (Empson, 2013; Head, 2012).

Writing in Forbes magazine, Susan Adams (2012) asked “could Coursera and its ilk replace a \$250,000 college degree and decimate the world of brick-and-mortar colleges and universities?” (par. 2). “Suddenly” she argued,

the world of elite higher education is opening up to the masses. Students at lesser colleges may become able to augment their course offerings with top instruction from great professors at prestigious universities. They may gradually learn that they can learn online all they need from top-class professors for a degree as good as that from any school. (par. 7)

At the time (2012-2013) it was not uncommon to hear MOOCs frequently described as the “end of the university” (Harden, 2012). The New York Times called 2012 “The Year of the MOOC” (Pappano, 2012). In *The American Interest*, Nathan Harden (2012) proclaimed,

In fifty years, if not much sooner, half of the roughly 4,500 colleges and universities now operating in the United States will have ceased to exist. The technology driving this change is already at work, and nothing can stop it. The future looks like this: Access to college-level education will be free for everyone; the residential college campus will become largely obsolete; tens of thousands of professors will lose their jobs; the bachelor’s degree will become increasingly irrelevant; and ten years from now Harvard will enroll ten million students. (par. 1)

By 2015, however, many universities were moving away from MOOCs because many of the promises of MOOCs never materialized. For example, Jordan (2014) found that, on average, only 6.5% of students enrolled in a MOOC ever actually finished a course. In 2015, the University of California system ended its “Digital Campus” initiative when they discovered that “from spring 2012 through spring 2014, only 250 non-UC students finished a [online] class” (Drousseau, 2015, par. 5). San Jose State decided to “pause” its partnership with Udacity when it became clear that students taking the online classes scored worse than those taking face to face classes (Rivard, 2013a, par. 1). “According to the preliminary presentation, 74 percent or more of the students in traditional classes passed, while no more than 51 percent of Udacity students passed any of the three courses” (Rivard, 2013a, par. 19). Even Sebastian Thrun, the “Godfather” of the MOOCs and CEO of Udacity, who imagined in 2012 “that in 10 years, job applicants will tout their Udacity degrees...in 50 years...there will be only 10 institutions in the world delivering higher education” decided by 2013 that Udacity would leave the university

system and focus instead on corporate training (Leckart, 2012, n.p.; Schuman, 2013; Chafkin, 2013).

Cuban (2012) argues that the MOOC phenomenon is a perfect example of a “hype cycle”:

Right before our eyes we are experiencing the very beginning of the hype cycle. For many academic entrepreneurs deeply dissatisfied with the cost of higher education and the traditional teaching that occurs, the onset of MOOCs is exhilarating. It is an unexplored frontier where plunging into the unknown and taking risks could lead to exciting returns. The promise of a college education taught by stellar teachers delivered free to anyone in the world who has the smarts and grit drives higher education reformers. In 2012, MOOCs are at the very beginning of the Hype Cycle. (emphasis Cuban, par. 3)

A hype cycle “characterizes the typical progression of an emerging technology from user and media overenthusiasm through a period of disillusionment to an eventual understanding of the technology's relevance and role in a market or domain” (Linden & Finn, 2003, p. 4). The cycle is composed of five elements: the technology trigger, the peak of inflated expectations, the trough of disillusionment, slope of enlightenment, and the plateau of productivity (see Figure 6).



Figure 6. The Hype Cycle.

According to Linden and Finn (2003),

At the beginning of the cycle, enterprises know nothing about a technology and cannot make informed judgements about its costs and benefits. Therefore, the risk is high. At the end of the cycle, enterprises know more about the technology; thus, they can make informed decisions about when and where to apply it. (p. 6)

I believe the hype cycle is one way to describe how inflated optimism about certain technologies often conceals a belief in the inevitability of technologies to trend in particular directions and assure specific ends. In the case of the MOOC, as online technologies began to spread and the possibilities of transmitting larger and larger quantities of information, video, and sound became easier, many educational reformers assumed that the technology itself would inevitably drive the reconstruction of the university structure towards all online platforms. Instead, the MOOC has virtually disappeared and the proclaimed demise of the brick and mortar university has not come to pass.

While the hype cycle is primarily meant to describe an overzealousness in the faith of new technologies, the broader implications of such enthusiasms has real effects on how we conceptualize the nature of technology in educational contexts. As ICT technologies have developed, many institutions have adopted technologies based primarily on the promise of the technology itself.

Larry Cuban (2001) argues that the use of educational technologies has been historically driven by three goals:

Goal 1: Make schools more efficient and productive than they currently are.

Goal 2: Transform teaching and learning into an engaging and active process connected to real life.



Goal 3: Prepare the current generation of young people for the future workplace. (pp. 13-15)

But, often, as Cuban (2001) has shown in *Oversold and Underused*, simply because a technology can do something doesn't mean the intended result is inevitable nor, in many instances, is it even desirable. For instance, according to Cuban (2001), many of the promises of the computer revolution in education have actually led to unexpected outcomes:

- *Unexpected outcome*: In the schools we studied, we found no clear and substantial evidence of students increasing their academic achievement as a result of using information technologies.
- *Unexpected outcome*: The overwhelming majority of teachers employed the technology to sustain existing patterns of teaching, rather than to innovate.
- *Unexpected outcome*: Only a tiny percentage of high school and university teachers used the new technologies to accelerate student-centered and project-based teaching practices. (Most preschool and kindergarten teachers already used such practices.). (pp. 183-184)

What is clear from Cuban's (2001) research is that the aims of ICT use in classrooms do not always match the reality of ICT use in classrooms. Again, consider the MOOC.

Interestingly, rather than a complete destruction of the university, many of the functions of MOOCs have been adapted to suit different learning structures, such as the rise of online learning in the form of "blended" "flipped" and "distance education" (Horn & Staker, 2011).

Blended learning refers to the use of ICT technology to deliver the bulk of a lesson (e.g., lectures, movies, PowerPoints, etc.) online while leaving classroom time for face-to-face supplemental instruction. Advocates of this model argue that the blended learning approach

offers the best of both worlds: a highly personalized and flexible learning environment along with the one to one guidance of a teacher to assist in one's studies. Students can view and interact with the main content of the lesson at their own leisure, while classroom time is spent deepening and clarifying difficult or unclear skills or topics.

[Blended-learning programs] can let students learn at their own pace, use preferred learning modalities, and receive frequent and timely feedback on their performance for a far higher quality learning experience...[and] schools can leverage technology to create radically different staffing structures that increase school-wide student-teacher ratios, even as students experience more personalized learning from more effective teachers. (Horn & Staker, 2011, p. 6)

The argument I am making here is not to advocate for blended learning, but to illustrate how blended learning is another example of the logical malleability of ICTs. I am arguing that the fate of MOOCs and the rise of blended learning suggest a confirmation of the philosophical premise on which much of a PI approach to educational technology is built—technology, itself, is not determinative of specific ends. Instead, ICTs, like knowledge itself, are endlessly adaptable to address individual needs and problems regardless of the original intent of their design. When considering ICTs as tools for learning a PI approach challenges educators to consider ICTs, like all other educational technologies, as tools evolving out of the needs of learners (individually and collectively) to solve problems related to experience. Technologies, no matter how novel or advanced, come into existence for human purposes and human needs. A PI approach argues that there is no inevitable path technology must follow because, especially in an educational setting, technologies are a result of the processes of inquiry; their effectiveness and usefulness come from their ability to help us adapt and solve problems. While a particular

technology may be originally intended for a specific outcome, there is no guarantee that the technology itself will produce that outcome, nor be exclusively used for such an outcome, because empirical circumstances and human purposes are constantly changing.

### **Personalization and Constructionism**

Blended learning also highlights another commonly claimed advantage of using ICTs in education: ICTs allow educators and students to personalize their learning.

In contrast to the traditional one-size-fits-all education dictated by externally prescribed curricula, we could imagine education as a personalized experience that supports the development of interests and strengths of each child. What is worth learning is determined by the child rather than by external bodies. It is whatever provides the best opportunity for individual students to pursue their passions and enhance their strengths. (Zhao, Zhang, Kei, & Qiu, 2015, p. 116)

Buckingham (2007) argues that ICTs

can enable learners to access information and guidance – and hence to make informed choices – about where, how and what to learn. It can assist learners in “co-designing” their learning, recognizing their diverse skills and knowledge, and giving them greater control over the content, pace and process of learning. It can help to create more diverse learning environments, not just by “extending” schools but also by providing “anytime, anywhere opportunities for collaborative learning”, for example through mobile technology...and it can assist in developing “learner-focused” assessment and feedback, for example through the use of e-portfolios. (Kindle Locations, pp. 666-670)

McLoughlin & Lee (2008) consider personalization as one of the “3 P’s” of ICT technology alongside participation and production: “The expanding lexicon of Web 2.0 applications

(podcasts, web logs, wikis, mashups, etc.) signal changes in the learning landscape, where learners are active participants, creators of knowledge, and seekers of engaging, personal experiences” (p.11). According to Collins & Halverson (2009) ICTs allows students to “customize” their learning: “Customization refers to providing people the knowledge they want when they want it and to supporting and guiding them as they learn” (p. 8).

One early advocate of computer personalization was Seymour Papert (1993). As the onetime director of MIT’s artificial intelligence lab, Papert (1993) was one of the first technologists to promote and experiment with the educational use of computers. In *Mindstorms: Children, Computers and Powerful Ideas* (1980) and *The Children’s Machine: Rethinking school in the Age of the Computer* (1993), Papert (1991) developed an approach to educational technology he called *constructionism*.

Constructionism--the N word as opposed to the V word--shares constructivism's connotation of learning as “building knowledge structures” irrespective of the circumstances of the learning. It then adds the idea that this happens especially felicitously in a context where the learner is consciously engaged in constructing a public entity, whether it's a sand castle on the beach or a theory of the universe. (p.1)

I have intentionally avoided use of the term *constructivism* up to this point because the term means different things to different people. It does not have an essential meaning. However, because Papert (1993) is careful to distinguish his ideas from constructivist ideas, and because Dewey is often considered a sort of proto-constructivist along with Rousseau, Pestalozzi, and G. Stanley Hall, it is important to take a moment to specify in what ways Dewey’s PI might be considered constructivist and in what ways it may not (Ackerman, 2001; Vanderstraeten, 2002). To that end, I will borrow from DC Philips (1995) who argues that constructivism is comprised

of both “good” and “bad” assertions:

the *good* [of constructivism]...is the emphasis that various constructivist sects place on the necessity for active participation by the learner, together with the recognition (by most of them) of the social nature of learning; it seems clear that, with respect to their stance on education, most types of constructivism are modern forms of progressivism... The *bad*...is the tendency within many forms of constructivist epistemology (despite occasional protestations to the contrary) towards relativism, or towards treating the justification of our knowledge as being entirely a matter of sociopolitical processes or consensus, or toward the jettisoning of any substantial rational justification. (Italics Phillips, p. 11)

While it is true that a PI account of knowledge resembles some constructivist claims that knowledge is a social construction, PI clearly avoids any arguments that conceptualize knowledge as entirely a reflection of the material world (materialism) or entirely a product of individual mental processes (subjectivism). If constructivism is only understood as a learning theory based on subjectivist accounts of knowledge, then a PI account of learning cannot and should not be considered constructivist. If, on the other hand, constructivism is understood as a theory of learning in which the experiences and needs of the individual learner influence the outcome and purpose of learning, then a PI approach to learning does align with aspects of the constructivist framework. In this sense Dewey and Papert (1993) share some constructivist sensibilities because of their common belief that learning is a social *activity*.

There is a family resemblance (and I shall accept the word progressive to name it) between the vision of learning I am presenting here and certain philosophical principles expressed in the diverse form of innovations that go under such names as progressive or

open or child-centered or constructivist or radical education. I certainly share with this broad movement the criticism of the School as casting the child in the role of passive recipient. (Papert, 1993, p. 14)

Papert's (1993) argument for constructionism draws on the influence constructivism had on his thinking combined with a Deweyan belief in the socially interactive nature of learning. Papert (1993) argued that the computer, practically and philosophically, was a unique tool that could help transform education along constructionist lines. It could empower students and make real many of the same goals Dewey argued for in his education through occupations. "With much more persuasive power than the philosophy of even so radical a thinker as Dewey" Papert (1993) wrote, "the computer, in all its various manifestations is offering...new opportunities to craft alternatives" (p. 6). Like Dewey, Papert (1993) was concerned that "a prevailing tendency to overvalue abstract reasoning is a major obstacle to progress in education" (p. 135). According to Ackerman (2001),

Papert's constructionism...focuses more on the art of learning, or "learning to learn", and on the significance of making things in learning. Papert is interested in how learners engage in a conversation with [their own or other people's] artifacts, and how these conversations boost self-directed learning, and ultimately facilitate the construction of new knowledge. (p. 1)

An example of Papert's (1993) constructionist approach was his development of a curriculum that brought together the Logo computer coding language and Lego robots. In this project, students learned how to code by programming tiny robotic Legos, using Logo, to solve problems related to the movements of their Lego robot. For instance, in one case a student, Ricky, wanted to figure out how to solve the problem of motor vibration by programming his

robot to “walk” with the vibrational movements of the engine. Ricky discovered that if he gave his Lego legs, in a particular spot, he could harness the vibrations.

He did not follow an exact plan. Although he did have a goal and was committed to realizing it; his goal was allowed to evolve as it worked. He did not build a robot by drawing on methods or materials made for that purpose; he used what he found at hand, even taking pleasure in using something made for a different purpose. (p. 131)

Ricky was engaging in what Papert (1993) called bricolage.

Bricolage is a metaphor for the ways of the old-fashioned traveling tinker, the jack-of-all-trades who knocks on the door offering to fix what is broken. Faced with a job, the tinker rummages in his bag of assorted tools to find one that will fit the problem at hand and, if one tool does not work for the job, simply tries another without ever being upset in the slightest by the lack of generality. (p. 144)

Much like Dewey’s experimentalism, bricolage is the process of experimenting and adapting to circumstance by “improving the skill of making—and fixing and making—mental constructions” based on the real-world consequences of one’s actions (Papert, 1993, p.144). For Dewey,

The method of intelligence manifested in the experimental method demands keeping track of ideas, activities, and observed consequences. Keeping track is a matter of reflective review and summarizing, in which there is both discrimination and record of the significant features of a developing experience. To reflect is to look back over what has been done to extract the net meanings which are the capital stock for intelligent dealing with further experiences. (*EE*, p. 87)

In much the same way Dewey conceptualized education through occupations, Papert (1993) argued that one of the advantages of the computer is that it enabled students to

experiment in environments (“microworlds”) that were safe.

The microworld is created and designed as a safe place for exploring. You can try all sorts of things. You will never get into trouble. You will never feel “stupid”...you will be totally safe in this little world. And yet while being safe, it is also designed to be discovery-rich in the sense that little nuggets of knowledge have been scattered around in it for you to find. (Papert, 1987, p. 80)

In a more contemporary context, some argue that virtual worlds, specifically virtual games, can also be “discovery-rich” and used to cultivate purposeful inquiry. For instance, one example is the popular on-line game Minecraft. Minecraft belongs to class of games called MMPORGs or Massive Multiplayer Online Roleplaying Games and allows users to manipulate and construct digital blocks to create any type of virtual world they can imagine. Players of Minecraft interact with the game as a character, build digital worlds, and play with other users from all around the world. According to Cunningham (2009), “the engaging, lifelike quality of these games, and their capacity to foster social knowledge construction, especially those relying on cooperation with others to achieve goals have led more and more people to realize that these games aren’t just recreational, but potentially educational as well” (p. 52).

Waddington (2015), argues that games like Minecraft offer the possibility that “certain types of video games may offer us a way to get around some of the most significant obstacles that caused education through occupations to fail the first time around” (p. 7). For instance, Short (2012) demonstrates multiple ways science teachers can use Minecraft to engage students in science specific lessons that would be difficult and costly if done in a non-digital environment. For example, when studying chemistry, Short (2012) demonstrates how Minecraft easily allows students to harvest digital materials and combine them into digital products requiring a basic



understanding of chemistry.

Smelting of iron and gold ore using a furnace produces the pure metal. Sand may be heated in order to make glass or turned into sandstone. Cakes may be crafted from wheat, eggs, milk and sugar. Explosives (TNT) may be crafted from gunpowder and sand unlike its real world multistep preparation. (p. 57)

The virtue of smelting iron digitally, of course, is that the dangers and costs of doing so are greatly reduced in an all digital environment, while the skills and chemical knowledge required ostensibly remain. Furthermore, because these activities can involve entire classrooms spread across different continents, it is argued, these games,

...can recreate complex and pivotal social systems in such a way that children and adults can experiment with and learn about them at a profound level. Anyone who is sympathetic to Deweyan educational principles should be excited about these possibilities. (Waddington, 2015, p. 20)

It is important to note, however, that ICT enabled personalization can be both a means towards creating “complex social systems” as well as a means towards creating restrictive and isolating social systems. For instance, there is growing evidence that online search engines and social media like Google and Twitter are increasingly creating what Pariser (2011) calls personalized “filter bubbles”: “personalization filters serve up a kind of invisible autopropaganda, indoctrinating us with our own ideas, amplifying our desire for things that are familiar and leaving us oblivious to the dangers lurking in the dark territory of the unknown” (p. 15). While online algorithm filters help organize and control the vast amount of data streaming through the internet every day, these filters have become increasingly more focused on reproducing content that mimics the already existent preferences of the users. For instance,

tracking software can trace every purchase, click, and glance—down to how long users hover over certain bits of content—whenever users visit a web site. This information is then shared and sold to marketers who use that information to attract users to particular web sites and content. Users that routinely click on particular sites, shop for particular types of products, or fall within certain demographics are frequently and unknowingly provided with content that exploits their preferences in an effort to spur users to purchase more, browse a particular way, or to visit certain platforms. “Ultimately” argues Pariser (2011),

the proponents of personalization offer a vision of a custom tailored-world, every facet of which fits us perfectly. It’s a cozy place, populated by our favorite people and things and ideas. If we never want to hear about reality TV (or a more serious issue like gun violence) again, we don’t have to.... (p. 12)

In *Alone Together*, Sherry Turkle (2011) demonstrates how ICTs and “social networks” can also contribute to social isolation. While on-line networks appear to connect us in ever expanding ways, Turkle (2011) argues, “the ties we form through the Internet are not, in the end, the ties that bind. But they are the ties that preoccupy” (p. 280). She continues, “We go online because we are busy but end up spending more time with technology and less with each other. We defend connectivity as a way to be close, even as we effectively hide from each other” (p. 281). Ironically, Turkle (2011) argues, because ICTs enable constant connectivity with others ICTs are also extremely intrusive:

We fill our days with ongoing connection, denying ourselves time to think and dream. Busy to the point of depletion, we make a new Faustian bargain. It goes something like this: if we are left alone when we make contact, we can handle being together. (p. 203)

In a PI sense, the problem of unwittingly focusing users’ attention in a particular

direction is that individual learners may be cut off from a broader ecosystem of differing opinions or contradictory information. The internet, rather than being a wide-open forum of communication challenging users to confront diverse opinions and information, becomes a device to channel and reinforce habits of attention and opinion that go unchallenged. As discussed in chapter two, Dewey argued that when habits constrain inquiry and reinforce dogma they no longer function as efficient tools of growth. In such cases, habits become like stubborn ideologies that no longer comport to the realities of empirical consequences.

While Papert (1993) and Dewey both argue that the interest and attention of the student are important to the process of learning, both also contextualize interest and attention as functions of broader social interactions in which collaboration and cooperation with others shape responsible inquiry. “[In] the new schools, the primary source of control resides in the very nature of the work done as a social enterprise in which all individuals have an opportunity to contribute and to which all feel a responsibility” (*EE*, p. 56). As I argued in chapter two, Dewey argued that freedom of inquiry was necessary to the preservation and maintenance of a democratic way of associative living because such freedom empowered the sharing and collaborative strengths of inquiry itself.

Responsibility for the conduct of society and government rests on every member of society. Therefore, everyone must receive a training that will enable him to meet this responsibility, giving him just ideas of the condition and needs of the people collectively, and developing those qualities which will insure his doing a fair share of the work of government. If we train our children to take orders, to do things simply because they are told to, and fail to give them confidence to act and think for themselves, we are putting an

almost insurmountable obstacle in the way of overcoming the present defects of our system and of establishing the truth of democratic ideals. (*ST*, p. 304)

Like Dewey, Papert (1993) also believed that computer technologies, when used educationally and *constructionally*, could be more than just tools for individual growth (although they are that as well), they could also be tools for the growth a community of inquirers.

[Papert's] contribution is to remind us that intelligence should be defined and studied *in-situ*; alas, that being intelligent means being situated, connected, and sensitive to variations in the environment...Papert draws our attention to the fact that "diving into" situations rather than looking at them from a distance, that connectedness rather than separation, are powerful means of gaining understanding. Becoming one with the phenomenon under study is, in his view, a key to learning. (Ackerman, 2001, p. 8)

The point I am making here is that Dewey's philosophy of education through occupations, like Papert's (1993) constructionism, is an argument that educational technologies promote growth when the technologies empower students to want to learn because the use of the computer is part of a larger act of inquiry in a community of inquiry; it is an act of ownership and extension of personal desire, of play, and effects certain habits of active investigation. In other words, both education through occupations and constructionism provide the conditions whereby students *want* to reflect on what they are doing because reflecting is central to the success of the process itself:

The essentials of method are therefore identical with the essentials of reflection. They are first that the pupil have a genuine situation of experience--that there be a continuous activity in which he is interested for its own sake; secondly, that a genuine problem develop within this situation as a stimulus to thought; third, that he possess the

information and make the observations needed to deal with it; fourth, that suggested solutions occur to him which he shall be responsible for developing in an orderly way; fifth, that he have opportunity and occasion to test his ideas by application, to make their meaning clear and to discover for himself their validity. (*DE*, p. 163)

Of equal importance, both outlooks also argue that that individual interest emerges from a larger community of interests. As I noted in chapter four, Dewey's education through occupations stresses collaboration among students. The direct goal of the collaboration was to solve a common problem while indirectly promoting habits of active inquiry to enrich the experiences of the individual and the group. The occupational projects students undertook merely set the conditions through which interest, content, and social association were ideally interwoven.

The essence of the demand of freedom is the need of conditions which will enable an individual to make his own special contribution to the group interest, and to partake of its activities in such ways that social guidance shall be a matter of his own mental attitude, and not a mere authoritative dictation of his acts. (*DE*, p. 301)

Thus, in a PI sense, the use of ICTs in education should ideally engage students' interests by empowering them to accept responsibility for their learning within a community of learners by inspiring them to be aware of the effects of the tools and methods on the process of inquiry itself.

### **Technological Transparency**

Papert's (1993) constructionism and Dewey's education through occupations also challenge educators, students, and policy-makers to accept responsibility for the use of technology by linking inquiry to an exposure of the inner workings of technology itself. "More

than 100 years ago, Dewey noted that, in order for students to become critical consumers of knowledge and effective actors in social contexts, they needed to understand how technological processes function” (Shaikh, et al. 2011, p. 90). Through occupations, for instance, students learned about how an engine worked by rebuilding an engine, and how to farm by actually farming. David Waddington (2010) calls the exposure of technological processes “technological transparency” (p. 621). According to Shaikh et al. (2012), technological transparency is “the idea of understanding how systems, processes, and related mechanisms within society work [and] can help individuals progress beyond the mere use of technologies towards developing critical perspectives” (p. 87). Technological transparency is the idea “that making production processes open and transparent [is] critical to helping citizens become more effective learners and agents” (Shaikh, et al., 2012, p. 94). According to Shaikh et al., (2012) “when individuals understand the processes at work behind knowledge production, it can have a profound effect in inspiring them to modify or create knowledge of their own” (p. 95).

Transparency also involves understanding and reflecting on the historical and social contexts from which the technologies have evolved. PI argues that the values technologies express are the result of the social and historical circumstances and people for whom the technology was designed. A PI approach argues that as technologies evolve, they do so based on the needs and values of those using the technology.

An education which acknowledges the full intellectual and social meanings of a vocation would include instruction in the historic background of present conditions; training in science to give intelligence and initiative in dealing with material and agencies of production; the study of economics, civics, and politics, to bring the future worker into touch with the problems of the day and the various methods for its improvement. Above

all, it would train power of readaptation to changing conditions so that future workers would not become blindly subject to fate imposed on them. (*DE*, p. 319)

In an educational context, therefore, accepting responsibility for the uses of ICTs involves observing and reflecting on the inner workings of technology itself to understand how ICTs are designed, how hardware and software work, the basics of computer coding and HTML languages, and how networks interact. Socio-historically, exposing the inner workings of technology also means reflecting on the social and historical contexts from which the technology arises.

### **TPACK**

Koehler & Mishra's (2009) "technological pedagogical content knowledge" (TPACK) framework suggests another way to think about how educators can accept responsibility for ICTs (p. 60). As a pedagogical framework, TPACK is meant to help teachers conceptualize how technological knowledge can be integrated with pedagogical and content knowledge. The framework suggests that

the basis of effective teaching with technology, require[s] an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones. (p. 66)

What makes the TPACK model attractive from a PI perspective is the recognition that teaching (and learning) in an ICT environment requires the integration of ICT technologies across various

epistemological domains—specifically content and pedagogy (see Figure 7).

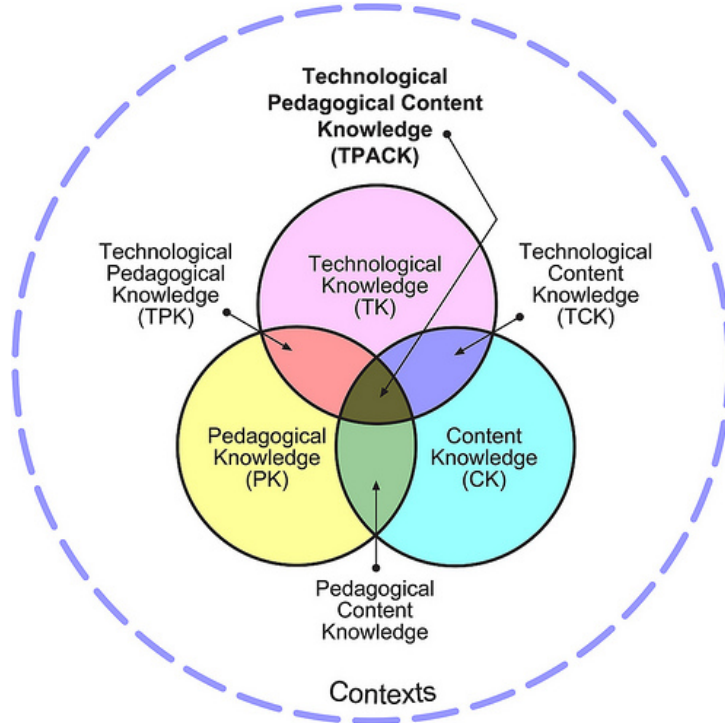


Figure 7. The TPACK framework and its knowledge components.

Although Koehler & Mishra (2009) initially conceived of this framework in relation to teaching, it can also be more broadly applied to learning as well. Specifically, when Koehler & Mishra (2009) consider the role of technological content knowledge to be “an understanding of the manner in which technology and content influence and constrain one another” they are suggesting a program of attention equally applicable to students engaged in the process of inquiry (p. 65).

[students] must also have a deep understanding of the manner in which the subject matter (or the kinds of representations that can be constructed) can be changed by the application of particular technologies. [Students] need to understand which specific technologies are best suited for addressing subject-matter learning in their domains and how the content dictates or perhaps even changes the technology—or vice versa. (p. 65)



The arguments for technological transparency, TPACK, and PI all assert that knowing how to use ICT technology in a purposeful and educative way requires more than just knowledge about what the technologies can do; it also requires an understanding of the technology itself. Obviously, not every student or teacher can become an expert in every facet of new technology, nor is that what is recommended, but a PI approach to ICTs does suggest that a basic “literacy” in the mechanics of digital technology is an important element in the responsible and deliberate use of the technology.

It is a question of acknowledgment on the part of scientific inquirers of intellectual responsibility; of admitting into their consciousness a perception of what science has actually done, through its counterpart technologies, in making the world and life what they are. (*ION*, pp. 66-67)

If students remain ignorant of the processes underpinning computers, for instance, their capacity to use the technology is limited to the parameters of the designer and engineer. From a PI standpoint, such limitation dramatically restricts the ability to participate in the production of knowledge: “Intelligence becomes ours” argues Dewey, “in the degree in which we use it and accept responsibility for consequences” (*HNC*, p. 314). As students increasingly inhabit an ICT-mediated world and develop greater skill at using technologies to navigate the conditions and phenomenon they identify as problems, a PI approach to education merely seeks to make that navigational process known through “reflective attention”:

A person who has gained the power of reflective attention, the power to hold problems, questions, before the mind, *is* in so far, intellectually speaking, educated. He has mental discipline--power *of* the mind and *for* the mind. Without this the mind remains at the mercy of custom and external suggestions. (*SS*, p. 147)

In a PI sense, to fully accept responsibility for the aims and uses of ICTs in education is to approach ICTs as highly malleable tools arising out of and assisting in the process of inquiry and growth. Through continual observation, experimentation, and reflection on how ICTs solve problems—both as the tools learners *use* to solve problems and as the *process* through which students inquire—a PI approach challenges educators, students, and policy makers to recognize that *they* assign value to ICTs in relation to educational aims and practices, not the technology itself. According to Hickman (1992), “where technology fails to be responsible, it is not because technology as method has failed, but because inquiry and testing have been misdirected, subsumed to nontechnical ends, or aborted” (p. 202).

Ultimately, the educational value of technology, Dewey argues, is determined through the judgment of individual students. While the context within which a student forms judgement about meaning is frequently influenced by social, political, and economic conditions, the final value of any inquiry is determined according to the consequences the inquiry has on the experiences of the student himself.

We are given to thinking of society in large and vague ways. We should forget “society” and think of law, industry, religion, medicine, politics, art, education, philosophy—and think of them in the plural. For points of contact are not the same for any two persons, and hence the question which the interests and occupations pose are never quite the same.... There is no society at large, no business in general. Harmony with conditions is not a single and monotonous uniformity, but a diversified affair requiring individual attack. (*ION*, p. 80)

To accept responsibility for ICTs, therefore, is to recognize that when, how, and why individuals interact with ICTs, or any other technology, is of foundational importance to the

learning process itself. Furthermore, because learning is an open-ended process, ever developing within the social contexts of individual experience, cultivating habits that expose the technology as an object and element of thinking empowers individuals to discern the meaning of the technologies as it relates to the purposes they determine.

### **Conclusion**

In this chapter I have argued that there are many similarities between the industrial and digital revolutions. Both have dramatically reshaped the material, social, and cultural conditions of daily life. Furthermore, I have also argued that many of the contemporary debates regarding the educational aims and purposes of modern ICTs both grow out of *and* directly challenge many of the educational aims and norms first established in the industrial era.

Like many of the stated advantages of industrial technologies, ICTs are frequently thought of as efficient and inexpensive means to fixed-ends. The ability of digital technology to quickly gather, transmit, and record infinite layers of lexicographical, auditory, and visual information is unparalleled in human history. For some, this ability suggests that educational institutions use the technology to efficiently deliver, measure, and monitor educational achievement. Given the power of digital technology to transcend the problems of time, space, and accessibility, the only curricular question remaining, they argue, is how to engineer the system to ensure students develop the skills necessary for working and living in the 21<sup>st</sup> century. For others, ICTs offer the tantalizing possibility that every student will soon be able to learn according to his or her own needs at his or her own speed. Rather than a one size fits all approach, ICTs enable a highly customizable curriculum in which everyone can learn according to the specific developmental needs and interests of the student. At the farthest extreme, the school building itself is an extraneous and unnecessary encumbrance. Students can follow their

innate curiosities to learn the material they find most compelling at speeds and in locations that are most amenable to their own personalities and wants.

On both sides of the spectrum, be it the promise of ICT-enabled curriculum that emphasizes the attainment of predetermined standards, or the individualized curriculum of personalized learning, the technology is often cast as a force unto itself that is either devoid of values or deterministically complicit in bending educational norms to innate technocratic ends. Furthermore, whether one is a technological enthusiast or a technological skeptic frequently depends on whether one approaches technology from an engineering philosophy of technology or a humanities philosophy of technology.

What I have attempted to show throughout this dissertation is that Dewey's PI is an approach to knowledge, technology, and education that "evades" many of these problematic dualisms (West, 1989, p. 5). For Dewey, the conditions of living always involve other people and things; the development and growth of the individual is embedded in the social realities of associative living. Education, as a social activity, is an aspect of living whereby we learn how to apply our intelligence to problems that arise from our interactions with the world. Learning how to purposefully apply our intelligence involves exposing the process of thinking itself through a reflective attention to how we think. By exposing the process of thinking itself, we become aware of what we are about and we use that awareness to judge what we consider meaningful. From a PI perspective, therefore, when knowledge is understood as an adaptive function of human existence, arising out of the act of inquiry and for the purposes of solving problems, technology is a part of the inquiring process, both as an object and as a method of inquiry. To think is to solve problems that arise out of the conditions of living, and technologies arise from and assist the process of inquiry. From a PI perspective, technologies are both the process and

the product of thinking itself. To view technologies from pragmatically instrumental perspective is to be fully aware of our responsibility in determining the values and uses of the technology itself.

I also hope to have shown throughout this dissertation that Dewey's PI remains a philosophically significant approach to education more broadly, and to a consideration of ICT educational technologies more specifically. Dewey embraces technology as an invention of the human mind, for the purposes of the human mind, to solve problems of human existence. By exploring how Dewey understood the relationship between knowledge, technology, and education I hope to have shown that Dewey's approach to educational technology offers a pragmatic middle ground between the technological enthusiast and the technological skeptic, between the engineering philosophy of technology and the humanities philosophy of technology. Through Dewey's PI one can maintain a faith in the ability of the human mind to deliberately chose educational aims for the promotion of meaningful growth *and* be wary of the power of technology to impose technocratic values on human concerns. Dewey's insight is to argue that in both instances, be it faith in deliberative intelligence or a concern over technological determinism, the values expressed in and through technology reflect how humans relate to the world. Humans relate to the world through a thinking process that is manifested in habits of mind that utilize the power of observation, experimentation, and reflection. By exposing how we think, through and with technologies, we reveal how thinking itself is a value-laden instrumental process.

Finally, the rise of ICTs in education is an opportunity to consider anew how Dewey challenges us to accept our responsibility for the aims of education, and to reflect on how inquiry

itself is the foundation upon which all educational aims ultimately derive. If nothing else, I hope to have demonstrated, as argues Blacker (1993) that the

...most salutary outcome of the debate concerning the proper use of educational technologies may well be the re-opening of a sorely-needed dialogue concerning the grand aims of education itself. Dewey at his most inspired helps remind us of how important this discussion still is and how inclusive it must be. (p. 194)

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