CHAPTER 5: CONTEXTUALISTIC PERSPECTIVES

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ABSTRACT

This chapter provides an overview of Stephen Pepper's philosophical worldviews (1942) as a way of clarifying the philosophical assumptions of different perspectives. A detailed analysis of contextualism is provided, and the manner in which this worldview relates to both constructivist and behavioral theories in instructional design is explicated.

Keywords

Contextualism – A philosophical worldview in which any event is interpreted as an ongoing act inseparable from its current and historical context and in which a radically functional approach to truth and meaning is adopted. The root metaphor of contextualism is the *act-in-context*, and the truth criterion of contextualism is *successful working* or *effective action*.

Descriptive Contextualism – A variant of contextualism that has as its primary goal an understanding of the complexity and richness of a whole event through an appreciation of its participants and features. It seeks the construction of knowledge that is specific, personal, ephemeral, and spatiotemporally restricted, like a historical narrative.

Functional Contextualism – A philosophy of science and variant of contextualism that has as its primary goal the prediction and influence of events with precision, scope, and depth using empirically based concepts and rules. It seeks the construction of knowledge that is general, abstract, and spatiotemporally unrestricted, like a scientific principle.

5.1 INTRODUCTION

It can be difficult to fully appreciate the role philosophical assumptions play in the development of theory, science, and technology. This is particularly true in applied disciplines like instructional design, where scholars and practitioners often leave core assumptions unstated, cobble together patchwork theories or techniques in the hope of embracing diverse perspectives, or trust that brute force empiricism will reveal all of the relevant facts. Unfortunately, such practices make it difficult to clearly discern philosophical differences and are unlikely to contribute to the development of a coherent and progressive discipline. Those who do not specify their core assumptions or claim that they have none are typically just adopting those of the mainstream culture; those who carelessly integrate diverse theories run the risk of trying to combine mutually exclusive tenets and producing little more than incoherence; and those who trust in merely amassing raw empirical data are advocating a strategy that can be grossly inefficient, uncharacteristic of scientific research, and ill-suited to the development of true technological innovation. Theories, and the philosophical assumptions that guide their construction and evaluation, are the foundation of scientific and technological progress.

'Theory' has a wide variety of meanings in intellectual discourse, but we will restrict our discussion to a relatively simple interpretation: statements that are relatively precise and have relatively broad scope. Precision refers to the number of ways a particular phenomena can be explained with a given set of analytic concepts (the fewer, the better) and scope refers to the range of phenomena that can be explained with those concepts (the wider, the better). Theories are valuable because they allow for conceptual economy and parsimony, provide guidance for confronting new problems or situations, and prevent a discipline from becoming increasingly disorganized and incoherent (Hayes, Strosahl, & Wilson, 1999).

There are many different theories or statements we can generate to describe, interpret, and understand the events of our world. What determines the types of theories we construct and value? Philosophy. While many theories are obviously tied to empirical data, philosophical assumptions nonetheless guide the creation, assessment, and evaluation of knowledge claims and theories. Regardless of the empirical support a particular theory might enjoy, for example, it is typically not difficult to find scholars or practitioners who eschew it. Sometimes this is because the critics have different criteria (or respect) for empirical support, sometimes it is because they do not view the theory as compatible with their belief system, and sometimes it is because they have a competing theory that can account for the same data. In all of these cases, philosophical assumptions are impacting their evaluation of the theory. As suggested earlier, however, individuals often do not clearly reveal or explicate these assumptions when engaging in theoretical debates. It seems that clarity about such issues might allow more productive discussions and comparisons.

One approach to illuminating underlying philosophical assumptions is the root metaphor or worldview approach offered by Stephen Pepper in his book *World Hypotheses: A Study in Evidence* (1942). Pepper was what some would call a meta-philosopher: he philosophized about philosophy. In particular, Pepper was interested in identifying key similarities and differences among the many different schools of philosophy that have emerged over the centuries. As Morris (1997) notes, Pepper was "simply trying to make sense of the welter of philosophical and scientific ideas and concepts found in his day" (p. 531).

Pepper claimed that any philosophy can be categorized by the overarching metaphorical language it uses (its root metaphor) and the rules of evidence it embraces (its truth criterion). A *world hypothesis* or *worldview* consists of a distinctive root metaphor and truth criterion, and Pepper observed that well-developed philosophies tend to cluster around one of several such worldviews. The categories and concepts derived from a worldview's root metaphor serve as the basis for constructing theories or statements about the world, and its truth criterion provides the rules used to evaluate theories and knowledge claims. Pepper's framework can prove very useful for revealing the essential components, assumptions, and concerns of different discourse communities, and for this reason his work has recently received renewed attention in many areas (Ambrose,

1998; Berry, 1984; Berzins, 1979; Biglan, 1995; Bredo, 1994; Fox, 2006; Hayes, Hayes, & Reese, 1988; Lyddon, 1989; Minton, 1992; Morris, 1988; Overton, 1984; Prawat & Floden, 1994; Quina, 1982; Reese, 1991; Seifert, 2000).

This chapter briefly reviews Pepper's primary worldviews and then focuses on one that seems to inform a great variety of instructional design theory: contextualism. Varieties of contextualism are described and related to the field of instructional design, and the role contextualism could play in developing a more coherent, pragmatic, and progressive science of learning and instruction is outlined.

5.2 PHILOSOPHICAL WORLDVIEWS

Pepper (1942) wrote that a philosophical worldview is characterized by a root metaphor and truth criterion. A root metaphor is a well-known, familiar object or idea that serves as the basic analogy by which an analyst attempts to understand the complexities of the world. Those who adhere to the worldview of mechanism, for example, use the root metaphor of a machine to interpret events: the entire universe is considered to be like a machine, and the mechanist seeks to discover the discrete parts of this machine and understand how they relate to one another. A worldview's truth criterion, inextricably linked to its root metaphor, provides the basis for evaluating the validity of analyses.

Root metaphors roughly correspond to ontological assumptions, or views about the nature of being or existence (e.g., whether the universe is deterministic or not). Truth criteria roughly correspond to epistemological assumptions, or views about the nature of knowledge and truth (e.g., whether it is discovered or constructed). Morris (1997) notes that a worldview (e.g., mechanism) is a broad category that consists of an informally organized epistemology and ontology, while a specific philosophy (e.g., logical positivism) represents a more formally systemized version of its worldview's epistemology and ontology. As will be revealed later, particular philosophies operating under the same worldview can appear rather dissimilar due to differences in how they formalize their ontological and epistemological assumptions.

Like theories, worldviews can be evaluated by their degree of precision and scope. Pepper, in fact, uses these criteria to identify "relatively adequate" worldviews: those that strive for complete scope with absolute precision. While theories typically have good scope with regard to events in a particular domain, worldviews strive for unlimited scope with regard to *all* events. There are many different worldviews, and none have perfect scope and precision, but Pepper claims that these come closest while maintaining good internal consistency: *formism*, *mechanism*, *contextualism*, and *organicism*.

Before examining the worldviews in more detail, it is worth considering some of the cautions Pepper (1942) offered in regard to evaluating. One is that the adequacy of one worldview cannot legitimately be determined by another world view, nor do the shortcomings of one worldview necessarily strengthen the position of another. If one considers the assumptions of a worldview to be analogous to the rules for playing a game (they are, in a sense, rules for playing the game of philosophy), it is easy to see why this would be inappropriate. It would be similar to a baseball player criticizing tennis for its lack of homeruns – the criticism is illegitimate, obviously, because tennis is played under an entirely different set of rules. Likewise, it is illegitimate to criticize one worldview's analysis using a different worldview's rules for conducting analyses. A degree of philosophical humility is prudent for everyone, as no degree of empirical evidence will ever "prove" that one worldview is superior to another. Philosophical assumptions *enable* analysis, they are not the *result* of analysis (Hayes, 1993).

A second noteworthy caution is that eclecticism, at the level philosophical assumptions, is confusing and unproductive. This is because the root metaphors of the worldviews are autonomous and mutually exclusive. Keeping with our games analogy, this would be similar to trying to play a game that combines all of the rules of both baseball and tennis. Most of the rules of these two sports could not be implemented simultaneously. When

"game eclecticism" is pursued, it becomes virtually impossible to determine scoring, fouls, and winners (the game of Calvinball from the comic strip *Calvin and Hobbes* by Bill Watterson, illustrates this point beautifully). When philosophical eclecticism is pursued, it likewise becomes virtually impossible to evaluate theories or knowledge claims in any kind of clear, coherent, or systematic way. Both forms of eclecticism can be highly amusing, but neither is likely to produce very meaningful results.

5.2.1 Formism

Similarity is the root metaphor of formism, and *correspondence* is its truth criterion. There are two major variants of formism, termed immanent and transcendent. In immanent formism, the root metaphor is based on the perception that two or more objects are similar or alike (e.g., "these two apples are similar"). In transcendent formism, the root metaphor is based on the perception that objects conform to a preconceived form or pattern (e.g., "these apples are examples of the transcendent *apple* form"). A key process of formist analysis is either describing the similarities and differences between two objects, or naming and/or describing the forms of which the objects are examples. The measure of truth inherent in this root metaphor is "the degree of similarity which a description has to its object or reference" (Pepper, 1942, p. 181), or the *correspondence* between a description and its referent. Formism is said to be dispersive, with facts assumed to be unrelated unless proven otherwise. It is perhaps the oldest relatively adequate world hypothesis, and students of philosophy will recognize it as the world view of Plato (and possibly Aristotle).

5.2.2 Mechanism

In mechanism, the events, objects, and laws of nature are not assumed to be instances of separate and unconnected forms as in formism, but integrated parts of a single system. That system is characterized by mechanism's root metaphor of the *machine*. This world view assumes the universe to be organized a priori into a vast structure of interrelated parts—a machine—with truth determined by "the way ever more ambitious verbal formulae reveal the assumed organization of the world" (Hayes, 1993, p. 12). Constructivists may recognize mechanism as what they call objectivism or positivism, and it is the worldview underlying most of cognitive psychology. The mechanistic truth criterion is a more elaborate version of the *correspondence* truth criterion of formism, but might be better termed "predictive verification" since truth statements about the assumed organization of the world (i.e., predictions) are generally tested on new phenomena (Hayes, 1993). This form of analysis dominates much of the research in psychology and education, where there is a "long-standing tradition of developing and validating models of hypothetical constructs that predict behavior" (Biglan & Hayes, 1996, p. 50).

5.2.3 Organicism

The root metaphor of organicism can be described as *organic development*, while its truth criterion is that of *coherence*. Organicists view events as integrated organic systems that are living, growing, and changing, and truth is realized when "systems of belief . . . become more encompassing and integrative, leading towards an absolute, complete understanding" (Prawat & Floden, 1994, p. 42). Like mechanists, organicists consider all events and facts of the world to be interrelated. Unlike mechanists, however, organicists do not consider the whole (i.e., the organic system) to be merely a compilation of its parts; rather, the whole is primary and the parts are meaningful only as they relate to the overall system. Flux is an inherent characteristics of an organic system, and organicists thus accept change and novelty as a given, while stability and constancy are events to be explained. This quality is seen in developmental theories of learning and psychology that rely on stage models, such as the work of Piaget (Hayes et al., 1988).

5.3 CONTEXTUALISM

Contextualism is a worldview based on philosophical pragmatism, a tradition heavily influenced by the work of figures such as Charles Sanders Pierce, William James, Oliver Wendell Holmes, Jr., George Herbert Mead, and

John Dewey. As Menand (2001) notes in the preface to his historical treatment of the emergence of pragmatism in America:

> If we strain out the differences, personal and philosophical, they had with one another, we can say that what these . . . thinkers had in common was not a group of ideas, but a single idea—an idea about ideas. They all believed that ideas are not 'out there' waiting to be discovered, but are tools—like forks and knives and microchips—that people devise to cope with the world in which they find themselves (p. xi).

In pragmatism and contextualism, the truth and meaning of words lie in their function or utility, not in how well they are said to mirror reality. The truth criterion of contextualism is thus dubbed *successful working*, in which an analysis is said to be true or valid insofar as it leads to effective action, or achievement of some goal. This notion of truth does not require – and is not concerned with – the existence of absolute, foundational truths or assumptions about the universe. As James wrote, "the truth of an idea is not a stagnant property inherent in it. Truth *happens* to an idea. It *becomes* true, is *made* true by events" (1907/1948, p. 161).

For the contextualist, an idea's meaning is defined by its practical consequences and its truth by the degree to which those consequences reflect successful action. This extremely functional approach to meaning reflects Charles Darwin's influence on pragmatism, as his views on natural selection were just gaining widespread appeal among scholar's during the era in which pragmatism appeared (Menand, 2001). Pragmatism can be viewed as an application of Darwin's selectionism to epistemology: "In pragmatism, ideas are 'selected' (to be retained as true or valid) if they lead to successful action, just as in natural selection traits are selected (to be retained by the species) if they lead to reproductive success" (Fox, 2006, p. 10).

The root metaphor for contextualism is the commonsense notion of the ongoing *act-in-context*, such as reading a book, eating a sandwich, or teaching a class. Such events are practical, concrete actions that are "being performed by someone for some purpose in some context" (Reese, 1993, p. 72). In contextualism, context refers to both the current *and* historical context of an act; in fact, it is more context-as-history than context-as-place (Morris, 1997). While the current context of an act is important, to understand the meaning, function, and purpose of the act one must also have an appreciation of the historical context. It seems Pepper was basing his use of the term "context" on Dewey's notion of context as "the historical situatedness of the meaning and function of behavior" (Morris, 1997, p. 533). For these reasons, Pepper also referred to contextualism's root metaphor as "the historic event" (p. 232).

Contextualists analyze all phenomena as acts-in-context. Events and their contexts are considered integrated wholes and are separated into distinct parts only to achieve some practical purpose, *not* to reveal the true structure or organization of the world (as a mechanist might claim to be doing). In contextualism, such divisions are utilitarian, not foundational. Further, the entire universe and all of time are considered part of the full context of any event. How, then, does a contextualist know how much and which features of the potentially infinite context must be included to adequately characterize an act? The answer to this question is ultimately a pragmatic one (of course): it depends on one's purpose for attempting to characterize the act in the first place. Essentially, whichever features of the context aid in achieving the goal of the analysis may be included. This answer highlights the important role analytic goals play in the contextualism.

5.3.1 Analytic Goals

Pepper (1942) noted that in contextualism, "serious analysis . . . is always either directly or indirectly practical . . . . there is no importance in analysis just for analysis" (pp. 250-251). Analysis without some ultimate purpose is problematic in contextualism because neither the root metaphor nor the truth criterion make much sense

without a clear analytic goal. The *successful working* truth criterion is rendered meaningless in an analysis without an explicit goal because success can only be measured in relation to the achievement of some objective (Dewey, 1916/1953). Similarly, the root metaphor of the *act-in-context* is difficult to mount without an explicit goal because there would be no basis on which to restrict the analysis to a subset of the infinite expanse of the act's historical and environmental context (Gifford & Hayes, 1999). It is very difficult for a contextualist without an explicit goal to construct or share knowledge (Hayes, 1993).

5.3.2 Varieties of Contextualism

As noted earlier, worldviews are broad categories that can contain many specific philosophies. Analytic goals play such an important role in contextualism that the specific instances of this worldview can be distinguished by them (Hayes, 1993). The types of analyses conducted by contextualists and the kinds of knowledge they value are greatly impacted by their analytic goals. Even within the same domain (e.g., human learning), their goals and approaches can be quite different. Some may be interested in establishing a natural science, for example, while others may be interested in establishing a natural history (Morris, 1993). Such differences in purpose can result in systems of inquiry that, despite being based on the same worldview, appear quite dissimilar. Contextualistic theories can be divided into two general categories, based on their overarching analytic goals: *descriptive contextualism* and *functional contextualism* (Hayes, 1993).

Descriptive contextualists seek to understand the complexity and richness of a whole event through a personal and aesthetic appreciation of its participants and features (see Rosnow & Georgoudi, 1986). This approach reveals a strong adherence to the root metaphor of contextualism and can be likened to the enterprise of history, in which stories of the past are constructed in an attempt to understand whole events. There is no one complete or true account of any event, however; each account is localized to an individual with personal and aesthetic meaning and value, rather than global and final (Gifford & Hayes, 1999). Thus, knowledge constructed by the descriptive contextualist is like a historical narrative – personal, ephemeral, specific, and spatiotemporally restricted (Morris, 1993). Social constructivism (Gergen, 1985; Rosnow & Georgoudi, 1986), dramaturgy (Scheibe, 1993), hermeneutics (Dougher, 1993), and narrative approaches (Sarbin, 1986) are all instances of descriptive contextualism.

Functional contextualists, on the other hand, seek to predict and influence events using empirically-based concepts and rules (Biglan & Hayes, 1996; Fox, 2006; Gifford & Hayes, 1999; Hayes, 1993). This approach reveals a strong adherence to contextualism's extremely practical truth criterion and can be likened to the enterprise of science or engineering, in which general rules and principles are used to predict and influence events. Rules or theories that cannot potentially contribute to the prediction and influence of the events of interest are rejected or considered incomplete. Knowledge constructed by the functional contextualist is general, abstract, and spatiotemporally unrestricted (Morris, 1993). Like a scientific principle, it is knowledge that is likely to be applicable to all (or many) similar such events, regardless of time or place. The distinction between descriptive contextualism and functional contextualism is analogous to the distinction between natural history and natural science (Morris, 1993).

5.4 DESCRIPTIVE CONTEXTUALISM AND INSTRUCTIONAL DESIGN

Descriptive contextualism has had a significant impact on the field of instructional design in recent years, primarily in the form of approaches commonly grouped under the label of *constructivism*. Constructivists view knowledge not as "something we *acquire* but something that we *produce*" (Mautner, 1996, p. 83) and have challenged many of the traditional practices of the field on epistemological grounds. They consider both behavioral and cognitive psychology, which have informed many instructional design principles, to be representative of objectivism. Objectivist epistemology holds that the real world exists externally to the knower and that it has a complete and correct structure – or meaning – determined by its entities, properties, and relations (Lakoff, 1987). Because objectivism is antithetical to their view of knowledge, constructivists have been critical of many of the instructional practices informed by behavioral and cognitive psychology, such as

the emphasis on instructional objectives, the use of task and content analyses, and the reliance on criterion-referenced assessment techniques (Jonassen, 1991). Instead, they recommend a range of different techniques for enhancing instruction, such as providing complex, realistic learning environments; using cooperative learning, problem-based learning, and discovery learning strategies; employing advance organizers and concept maps; and nurturing self-awareness of the knowledge construction process (Driscoll, 2000; Morrison, Ross, & Kemp, 2007).

5.4.1 Clarifying Constructivism
Constructivists in education rarely identify themselves as pragmatists or contextualists, but it is clear that most forms of constructivism are based on the contextualistic worldview. Constructivism's defining premise – that knowledge is constructed rather than discovered – is merely a restatement of the pragmatic/contextualistic view on truth and meaning. The functional truth criterion of contextualism is also evident when constructivists reject the absolute truths and structuralism of objectivism, and the root metaphor of contextualism is apparent when constructivists emphasize the cultural and historical context in which education occurs or champion the design of authentic learning environments. Further, many prominent constructivist figures, including Dewey, Gergen, Bruner, and Vygotsky, are typically considered contextualists (Capaldi & Proctor, 1999; Reese, 1993). The relation between constructivism and contextualism is so apparent that Mancuso (1993) claims that "the basic tenets of constructivism as an epistemology demand an acceptance of a contextualist world view" (p. 120).

Constructivism is difficult to adequately characterize, however, because the term "refers to many ideas, joined by the merest thread of family resemblance and often expressing quite contradictory views" (Burbules, 2000, p. 308). There are perhaps dozens of different strains of constructivism, and Matthews (2000) suggests that there are more than 20 variants of educational constructivism alone. Recent books on constructivism in education (e.g., Phillips, 2000; Larochelle, Bednarz, & Garrison, 1998) reveal the vastness and complexity of the constructivist landscape, and provide a sense of the great theoretical variation that exists within the different constructivist systems.

The many variants of constructivism can be distinguished by a careful analysis of what they mean by "knowledge" and how they are claiming it is "constructed." The primary dimension on which the forms can be differentiated is whether they focus on the way(s) an individual constructs knowledge and meaning, or on the way(s) communities or social groups negotiate knowledge or truth (Phillips, 2000). Constructivist perspectives that emphasize individual knowledge construction are often identified as forms of *radical constructivism* (or sometimes *psychological constructivism*; Phillips, 2000), while those that emphasize the construction of public domains of knowledge are generally considered forms of *social constructivism*. Theorists can vary considerably with regard to how much they gravitate toward either of these two poles, and often disagree on the process by which knowledge is constructed or negotiated (Prawat & Floden, 1994; Phillips, 1995). Such differences can lead to surprisingly different suggestions on how best to improve educational practices, and make it easy to understand the proliferation of constructivisms in the educational literature.

In instructional design, authors rarely specify the type of constructivism to which they subscribe, and frequently seem unable to maintain philosophical fidelity to a single strain. Jonassen (1994), for example, operating under the general banner of constructivism, initially takes a radical constructivist position that "learners construct their own reality or at least interpret it based upon their perceptions of experiences" (p. 34), yet in the very next paragraph adopts a social constructivist stance that "much of reality is shared through a process of social negotiation" (p. 35). While these two statements are not necessarily logically incompatible, they do represent the thinking of quite different perspectives – perspectives that definitely have different goals and may even be based on entirely different worldviews. It has been argued that radical constructivism is based on organicism (Hayes et al., 1988; Prawat & Floden, 1994), while social constructivism is clearly contextualistic.

This lack of clarity in constructivist writing has no doubt contributed to the many questions and debates the movement has inspired: Does an extreme constructivist position make the practice of designing instruction

pointless or impossible (Winn, 1993)? Why do some constructivists seem to embrace information processing theory, while others reject it (Prawat & Floden, 1994)? Can constructivism serve as a prescriptive theory of instruction at all (Jonassen, 1994)? Why is it that when constructivist models are proceduralized, they seem so similar to traditional instructional design models (Dick, 1996)? Can constructivism be both an educational philosophy and a method (Lebow, 1993)? And, perhaps most importantly, "is constructivism destined to join discovery learning in the long list of educational enthusiasms that come and go, never articulated clearly enough to be tested, or in vogue long enough to prove their theoretical interest or practical worth?" (Cobb, 1999, p. 16).

Recognizing the contextualistic worldview underlying most constructivist theories may help resolve some of the confusion surrounding constructivism. By taking different approaches to defining 'knowledge' and 'construction', constructivists are actually adopting different analytic goals and content areas. Since the purpose of analysis in contextualism guides how the root metaphor is used and how truth is determined, the different constructivist theories are evolving (or have evolved) into contextualistic systems that value and develop different types of knowledge and analyses. This makes it difficult for different types of constructivists to engage in meaningful or useful discourse, and makes it particularly unwise to treat the variety of constructivist perspectives as though they represent a singular theoretical perspective.

While there are important differences among the constructivist theories in education, most can be accurately characterized as forms of descriptive contextualism. The clearest evidence of this is in their strong preference for qualitative research methodologies. Savenye and Robinson (2004) note that qualitative research is based on the notion that "humans construct their own reality" and typically involves "highly detailed rich descriptions of human behaviors and opinions" (p. 1046). Such research typically includes ethnographies, case studies, surveys, interviews, and historical and document analyses (Denzin & Lincoln, 1998). All of these methods closely resemble historical narrative, which exemplifies the type of knowledge pursued and constructed by descriptive contextualists.

5.4.2 Limitations

As forms of descriptive contextualism, constructivist theories get their strength from their close adherence to contextualism's root metaphor of the act-in-context. Descriptive contextualism's goal of achieving a personal understanding and description of the whole event aligns perfectly with the root metaphor, and for this reason the position is remarkably consistent (Gifford & Hayes, 1999).

Such theories also share the inherent weaknesses of descriptive contextualism (Gifford & Hayes, 1999; Hayes, 1993), however. The first is that it is hard to determine when the somewhat ill-defined goal of descriptive contextualism has been accomplished (Hayes, 1993). When is the narrative complete, or when has the story been told well enough? This problem is clearly recognized by many descriptive contextualists: "Qualitative narratives all have as their objective an authentic and holistic portrayal of an intact social or cultural scene . . . [but] the issue of what constitutes an authentic and holistic portrayal has become hotly contested territory" (LeCompte, Millroy, & Preissle, 1992, p. xv). Debates over the accuracy and completeness of different historical accounts of events also reflect these difficulties.

Another problem faced by descriptive contextualists is that the accomplishment of their goal does not necessarily result in any practical knowledge or benefits. A personal, holistic appreciation of a specific event may or may not yield information that is helpful for achieving any other goals held by the analyst or anyone else (Hayes, 1993). This is probably the most vexing problem facing constructivists in education, as they struggle to develop empirically verified practical applications of their theory (Cobb, 1999; Driscoll, 2000). By virtue of its own overarching purpose, constructivism is a *descriptive* theory of learning or knowledge, not a *prescriptive* theory of instruction (Jonassen, 1994). Descriptive contextualists and constructivists are typically not concerned about this lack of practical knowledge (it is not their purpose, after all). In advocating activity theory, for example, Jonassen notes that it "is not a theory of learning from which instructional prescriptions can be

reasonably drawn" (2006, p. 44). Some constructivists even criticize functional contextualism for its explicit focus on being "pragmatic" and "useful" (Hannafin, 2006, p. 40).

Though strong in its adherence to contextualism's root metaphor, descriptive contextualism is not well-suited to the development of practical knowledge. This view certainly has advantages and has made important contributions to the field, but it is difficult to use as a philosophy of science or as the foundation for an applied academic discipline like instructional design (Fox, 2006).

5.5 FUNCTIONAL CONTEXTUALISM AND INSTRUCTIONAL DESIGN

Functional contextualism has been offered as a philosophy of science that underlies modern behavioral psychology and that could also serve as a strong foundation for instructional design (Biglan, 1995; Fox, 2006; Gifford & Hayes, 1999; Hayes, 1993). As a philosophy that embraces the scientific principles of learning and conditioning developed in the field of behavior analysis, functional contextualism supports many of the guidelines for instructional development behavioral psychologists have developed over the years (see the chapter by Lockee and colleagues in this volume; see also Burton, Moore, & Magliaro, 2004; Fredrick & Hummel, 2004; West & Hamerlynck, 1992). In addition, recent functional-contextual research on language and cognition (Hayes, Barnes-Holmes, & Roche, 2001) promises to provide a more pragmatically useful way of speaking about complex human behavior that could have a significant impact on instructional practices. It has been argued that functional contextualism, while sharing the same worldview as most constructivist approaches, may offer a more cohesive view for conducting a science of learning and instruction "with increased clarity, precision, and concern for the construction of practical knowledge" (Fox, 2006, p. 21).

Behavioral psychology has traditionally been characterized as mechanistic, objectivistic, realistic, positivistic, and reductionistic. While this is accurate for some versions of behaviorism (and there are more than a dozen varieties; O'Donohue & Kitchener, 1999), it is not entirely true for the system developed by Skinner. Behavior analysis has contained elements of both mechanism and contextualism (Hayes et al., 1988), primarily due to philosophical inconsistencies in Skinner's writings and the gradual evolution of his ideas (Gifford & Hayes, 1999; Hayes et al., 1988; Moxley, 1999, 2001). Skinner's early work was decidedly more mechanistic and positivistic, but by 1945 his work reflected a much closer connection to pragmatism, selectionism, and contextualism (Moxley, 1999, 2001). When Skinner describes scientific knowledge as "a corpus of rules for effective action, and these is a special sense in which it could be 'true' if it yields the most effective action possible" (1974, p. 235), he is clearly embracing the pragmatic truth criterion and rejecting the objectivist and realist view of knowledge. In fact, many behavioral psychologists now explicitly embrace contextualism as the philosophy underlying their work (e.g., Barnes-Holmes, 2000; Biglan, 1995; Gifford & Hayes, 1999; Hayes, Hayes, Reese, & Sarbin, 1993; Lee, 1988; Morris, 1988; Odom & Haring, 1994; Roche, 1999). Functional contextualism can be seen as a clarification and refinement of the pragmatic philosophy underlying Skinner's later work and modern behavioral psychology.

5.5.1 Implications of the Analytic Goal

Due to differences in analytic goals, work based on functional contextualism (e.g., behavior analysis) appears quite dissimilar to work based on descriptive contextualism (e.g., social constructivism). Whereby descriptive contextualism is focused on creating a descriptive natural history of events, functional contextualism is focused on creating a pragmatic natural science that seeks "the development of an organized system of empirically-based verbal concepts and rules that allow behavioral phenomena to be predicted and influenced with precision, scope, and depth" (Biglan & Hayes, 1996, pp. 50-51). Functional contextualists study the current and historical context in which behavior evolves in an effort to construct general laws, principles, and rules that are useful for predicting and changing psychological events in a variety of settings.

Adopting the analytic goal of the prediction *and* influence of psychological events has important ramifications for a science of behavior (Biglan & Hayes, 1996; Fox, 2006). First, analyses focus on functional relations

between psychological events and manipulable (at least in principle) events in the environment. Much of educational and psychological theorizing focuses on relations between one type of psychological event (e.g., cognitive schema) and another (e.g., overt performance on a task). This is not productive for the functional contextualist, because we can only directly manipulate events in a person's environment (or the context of their behavior; Hayes & Brownstein, 1986). By emphasizing relations between two types of psychological events, cognitive theories provide little guidance on how to influence either event – it is like focusing on a correlation between two dependent variables rather than a functional relation between an independent variable and a dependent variable.

While functional contextualists agree with constructivists that "the learner is an active, changing entity" (Hannafin & Hill, 2002, p. 77), they do not downplay the vital role the environment and experience play in how the learner acts or changes. The learner does not act or change in a vacuum, after all. Thus, behavior analysts attempt to identify aspects of the manipulable environment that influence the occurrence, incidence, prevalence, or probability of both private and overt psychological events. Cognition and other internal mental events are interpreted by appealing to a person's learning history, rather than assuming they are underlying processes causing and controlling other psychological events or behavior.

In addition, the ultimate purpose of prediction and influence demands an emphasis on experimental research. To examine the impact a particular contextual variable has on an event, it is necessary to systematically vary that variable and measure the resulting impact on the event of interest; in other words, it is necessary to conduct an experiment (Biglan, 1995; Hayes, 1993). Purely descriptive or correlational research does not isolate which features of the context are influencing changes in the psychological event. Functional contextualists favor experimental techniques, but value any methodology that may contribute to their pragmatic goals (Biglan & Hayes, 1996). Both traditional group designs and time-series analyses of individual behavior can be employed effectively for the purposes of functional contextualism, and even correlational or predictive research can be useful for suggesting which contextual variables might be relevant to the event of interest. Qualitative methodologies also have their uses in functional contextualism, but are not as effective as experimental procedures for testing the influence of environmental variables on behavior or for verifying the general utility of principles.

5.5.2 Behavioral Principles and Applications

The most well-established principles for predicting and influencing psychological events are those related to classical and operant conditioning. This relatively small set of principles and concepts provides a precise way of speaking about learning that also has remarkable scope. For several decades the concepts and principles constructed by behavior analysts have proven remarkably effective in allowing teachers, parents, therapists, managers, administrators, trainers, and many others to change and improve the behavior of both humans and animals in many different contexts (Austin & Carr, 2000; Biglan, 1995; Dougher, 1999; Martin & Pear, 2003; Mattaini & Thyer, 1996).

Procedures derived from behavior analysis are typically considered best practice in the treatment and education of individuals with developmental disabilities, for example Scotti, Ujcich, Weigle, and Holland (1996), and Matson, Benavidez, Compton, Paclwasky, and Baglio (1996) reported on over 550 studies showing the efficacy of such methods with persons with autism. In clinical psychology, a 1995 report by the American Psychological Association's theoretically diverse Task Force on Promotion and Dissemination of Psychological Procedures indicates that over twenty of the twenty-seven clinical interventions listed as empirically validated are behavior therapy techniques (as cited in O'Donohue & Kitchener, 1999).

In instructional design, most are familiar with the considerable influence Skinner's programmed instruction movement (1954, 1968) has had on both instructional systems design and human performance technology (HPT; Binder, 1995; Reiser, 2002), but may be unaware of other behavioral contributions to education. Instructional methods such as the Personalized System of Instruction (PSI; Fox, 2004; Keller, 1968), Direct

Instruction (Becker & Carnine, 1980; Engelmann & Carnine, 1991; Kinder & Carnine, 1991), Precision Teaching (Merbitz, Vieitez, Merbitz, & Binder, 2004; Merbitz, Vieitez, Merbitz, & Pennypacker, 2004), Headsprout Reading Basics™ (Layng, Twyman, & Stikeleather, 2004), the Comprehensive Application of Behavior Analysis to Schooling (CABAS®; Greer, 2002), and the Morningside Model of Generative Instruction (Johnson & Layng, 1992; Johnson & Street, 2004) are all explicitly based on behavioral principles and enjoy an extensive amount of empirical support (see Moran & Malott, 2004 for a review of many of these methods). Because most constructivists mistakenly consider behavioral psychology to be objectivistic or mechanistic, they often reject these empirically supported methods simply because they are "inconsistent with those espoused by constructivists" (Hannafin, 2006, p. 39). When the pragmatic core of modern behavioral psychology is elucidated, as it is with functional contextualism, it is difficult to understand what quarrel constructivists could have with these methods.

Functional contextualists do not reject instructional methods simply because they originate from a different worldview or perspective. If a technique has been demonstrated to reliably enhance learning and performance, functional contextualists will embrace it (although they may speak of the learning process in a manner more consistent with their perspective). Contextualism as a worldview is particularly well-suited to technological eclecticism because of its pragmatic truth criterion – contextualists can readily adopt techniques and methods of other worldviews if it helps them achieve their analytic goal (Hayes et al., 1988).

Recent advances in behavioral research on language and cognition also hold great promise for education. In particular, Relational Frame Theory (RFT; Hayes et al., 2001) is an approach to understanding complex human behavior that is based on functional contextualism and basic behavioral principles. RFT also introduces a new behavioral principle that explains how basic stimulus functions – such as reinforcing, punishing, motivational, and discriminative functions – can be altered by verbal processes and relations. This new principle, while entirely consistent with operant theory, has important implications for how complex learning can be influenced (via instructional means or otherwise) and provides a functional account of the structure of verbal knowledge and cognition. A full account of RFT, its empirical support, and its implications are not possible here, but interested parties are referred to a comprehensive text on the theory (Hayes et al., 2001), an online tutorial introducing its basic concepts (Fox, 2005), a text on some of its applied extensions (Hayes, Strosahl, & Wilson, 1999), a special issue of the *Journal of Organizational Behavior Management* (Austin, 2006), and the RFT section of the website for the Association for Contextual Behavioral Science (Association for Contextual Behavioral Science, 2005).

5.6 CONCLUSION

Pepper's worldview analysis (1942) can be useful for clarifying underlying philosophical assumptions. By highlighting the contextualistic worldview shared by both constructivist and behavioral theories, shared assumptions and key differences are illuminated. Both constructivism and behaviorism have contributed significantly to instructional design and educational technology, but often reach contrary conclusions regarding instructional practices. A better understanding of their common philosophical heritage may lead to improved communication and collaboration, with the understanding that the relative value of each perspective will depend upon purpose and context (Morris, 1993).

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