

Learning, Creating, and Using Knowledge

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Concept Maps as Facilitative Tools in Schools and Corporations

Second Edition

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The Need for a Theory of Education

My thesis in this book is the same as it was in the first edition and in my earlier book, *A Theory of Education* (Novak, 1977a): Education, in any setting, is an enormously complex human endeavor; there are more ways to make changes that will be harmful or of little value than ways to make constructive improvements in education. A comprehensive *theory* of education is needed to give vision and guidance for new practices and research leading to steady improvement of education. The ideas in this book should apply to all educational settings, including schools, universities, corporations, technology-mediated education, and non-formal education, such as museums or hobbies.

Theories are ideas that *explain why* some set of phenomena in the universe behave as they do. The sciences have been enormously successful in devising theories, and though even the best theories evolve and change over time, these still make possible a steady advance in knowledge about how the natural world works and in prediction and control over an ever-widening range of events or phenomena. The theory of education presented in this book will explain why educational experiences we judge as effective are effective, and why those experiences we judge as ineffective are ineffective. For example, the theory of learning I will present explains why learning by *rote* is ineffective for long-term retention and application of knowledge and why *meaningful* learning is effective and necessary for creative thinking. As with all theories, there are no simple, direct answers (consider, for example, the theory of evolution), and yet I hope to explain, on a theoretical basis, what is in the ballpark of being “better” and what appears to be outside of this ballpark. The theory of education presented will be a composite of a theory of learning, a theory of knowledge, and a theory of teaching and management, each of which complements and supports the others.

Educating is more than science; it is also an art. It requires personal judgments, feelings, and values. Increasingly, of course, we are coming to recognize that the latter are also involved in science. Keller (1983) chose to title her biography of Nobel Laureate biologist Barbara McClintock, *A Feeling for the Organism*, expressing not only the careful research done by her but also her commitment and sensitivity to understanding plants. Issues of sensitivities

and values are becoming increasingly important in the sciences also, especially with the growing application of scientific ideas and tools for manipulating plant and animal (including human) genes. Throughout this book I shall make reference to issues that concern both the science of educating and the art of educating.

I will claim that *the central purpose of education is to empower learners to take charge of their own meaning making*. Meaning making involves thinking, feeling, and acting, and all three of these aspects must be integrated for significant new learning, and especially in new knowledge creation. In some ways, this is not a new idea. In the monograph published by the Educational Policies Commission (EPC), this statement was published in 1961:

The purpose which runs through and strengthens all other educational purposes—the common thread of education—is the development of the ability to think. This is the central purpose to which the schools must be oriented . . . the development of every student’s rational powers must be recognized as centrally important. (p. xiv)

One of the shortcomings of the EPC report is that it failed to recognize the central role that meaningful learning and acquisition of powerful conceptual frameworks in basic disciplines play in the ability to engage in rational thought. It also failed to recognize that students need explicit guidance in learning about learning and in the use of tools and strategies to facilitate meaningful learning. This guidance in learning and the use of tools to facilitate learning and understanding is becoming especially important in the corporate world. Learning and integrating new knowledge in collaborative settings is especially important in the highly competitive global markets in which corporations are operating. These will be some of the issues focused upon in this book.

Successful education must focus upon more than the learner’s thinking. Feelings and actions are also important. We must deal with all three forms of learning. These are acquisition of knowledge (*cognitive* learning), change in emotions or feelings (*affective* learning) and gain in physical or motor actions or performance (*psychomotor* learning) that enhance a person’s capacity to make sense out of their experiences. A positive educational experience will enhance a person’s capacity for thinking, feeling, and/or acting in subsequent experiences. A maleducative or miseducative experience will diminish this capacity. Humans engage in thinking, feeling, and acting, and these combine to form the *meaning* of experience (Figure 2.1). Recent research indicates that emotions are involved in an important way as we organize and retain experiences (Niedenthal, 2007). This book will focus on how to enhance the meaning of experience for any person.

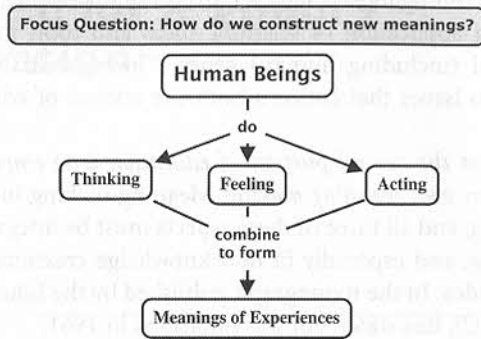


Figure 2.1 The meanings we construct from our experiences are a composite of our thinking, feeling, and acting during the experience.

The Five Elements of Education

In 1973, Joseph Schwab proposed that education involved what he called “four commonplaces.” His “commonplaces” were learner, teacher, subject matter, and social matrix. Each commonplace was necessary to consider and could not be “reduced” into one of the others (analogous to finding the lowest common denominator in fractions). Schwab’s commonplaces, and many of his other ideas, have proven to be of value to educators. They provide a kind of “check list” to assure that we are covering all the key checkpoints necessary to understand or to design an effective educational intervention.

Our studies in schools and other settings, notably corporate settings, however, have shown that much of what happens in teaching and/or learning depends upon the forms of appraisal used. Therefore, I wish to propose *evaluation* as a fifth *element* in education. I prefer the term *elements* to commonplaces because it connotes the idea that each is a building block for myriads of combinations that form educational events, much as the 100 or so elements of chemistry form an infinite variety of molecules.

My five elements are: (1) learner; (2) teacher; (3) knowledge; (4) context; and (5) evaluation. I add the last element because so much of what happens to people in life is based upon evaluation. For better or worse, the evaluations we are subjected to determine whether or not we can drive an automobile, graduate with “honors” or enter a university or graduate program or succeed in a corporate or other work setting. Unfortunately, so much of the “testing” that is done is really poor at evaluating human competencies, and I will deal with this issue throughout the book. Nevertheless, I see evaluation as an additional key element in education. Figure 2.2 shows a concept map with these elements. Concept maps, a knowledge representation tool that was developed in 1972 in our research program (Novak & Musonda, 1991), will be used extensively in this book. Strategies for developing and using concept maps have been

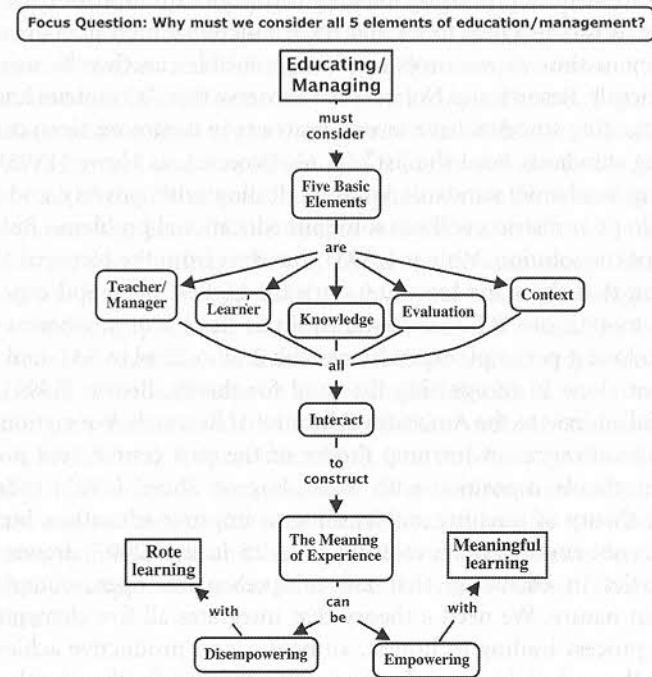


Figure 2.2 The Five Elements that comprise any educational event: learner, teacher, knowledge, evaluation, and context. All elements are present in an educative event and combine to construct or reconstruct the meaning of experience.

described in numerous publications and in *Learning How to Learn* (Novak & Gowin, 1984). As we shall see, concept maps and Vee diagrams (see Chapter 6) can also be powerful tools to aid learning as well as tools for evaluation.

Two additional factors operate in education: money and time. These are factors that influence any human enterprise and are not uniquely relevant to education. In general, we can improve any endeavor if we have more money and/or more time to pursue that endeavor. Moreover, the past few decades have illustrated that simply spending more money on education may not lead to significant improvement in student achievement (Hanushek, 1981; 1989; 1996). Lengthening the school day and/or the school year might lead to improvement in achievement; while I favor a 12-month school calendar, evidence for this is equivocal. It would certainly increase the cost of education. My thesis is that more money and time are not the primary needs for improvement of education. The debate on whether or not expenditures are related to student achievement is one that has gone on and will continue (cf. Hanushek, 1981; 1989; 1996; Hanushek, et al., 2008); Hedges, et al., 1994; Wainer, 1993). What is needed are promising new ideas and determination to apply these ideas and to set standards. A viable theory of education can help to

