BOOK REVIEW


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The U.S. education system faces a crisis at all levels. A study by the international Organization for Economic Cooperation and Development (OECD) found that, when compared to students from 70 countries, 15-year-olds from the United States averaged 15th in reading skills, 17th in science, and 25th, or below average, in mathematics (OECD 2010). The same report also shows the United States falling behind in student enrollment and graduation (Zeitvogel 2010). On the subject of higher education, Richard Arum and Josipa Roksa’s Academically Adrift: Limited Learning on College Campuses (2011) has garnered significant attention for arguing that most college students make little progress in higher order learning during their four-plus years in school. Many fear that America’s youth are not being adequately prepared for the needs of the new global economy and that they will be unable to compete with the innovations coming from China, India, and other foreign markets.

Fingers have been pointed at many different factors in attempts to assign responsibility for these educational difficulties: a lack of funding from federal and state governments; mismanagement by school administrations; No Child Left Behind and high-stakes testing; ill-trained or entrenched teachers and teachers’ unions; the influence of new technology on student attitudes and learning abilities; a consumer mentality that views education as a commodity; a loss of traditional values in education; and the list goes on. According to long-time science educator and educational researcher Joseph D. Novak, the root of the problem is the lack of a unified theory of learning that serves as the basis for systematic reform of educational methodology. In this revised edition of his 1998 Learning, Creating, and Using Knowledge, Novak marshals a significant body of practical and theoretical research to support his concept of “meaningful learning” as a unified theory of education that can radically improve learning on all levels, from early childhood to corporate development. The improvements he seeks are not merely quantitative gains in test scores but qualitative changes in the ways humans construct, integrate, and apply knowledge in academic and business settings. While recognizing the challenges to widespread change, Novak is ultimately optimistic about the possibilities for a full-fledged revolution in learning that will empower individuals and companies to harness human creativity and improve the human condition.

Novak bases his ideas on David Ausubel’s “Assimilation Learning” Theory, which holds that meaningful learning occurs when the learner negotiates between knowledge previously gained and newly acquired. This active engagement on the part of the learner results not in the rote memorization of facts but the construction and reconstruction of complex cognitive frameworks. By integrating information into a hierarchical structure that demonstrates the relationship between concepts, the learner develops a deeper understanding of knowledge; the process of learning accelerates as he or she can adapt these cognitive frames to incorporate additional information and new levels of complexity. In turn, the learner can apply his or her knowledge in more effective and more creative ways. For Novak, Ausubel’s theory provides a powerful foundation upon which to build a comprehensive theory of education. He expands Ausubel’s primarily cognitive focus to include
also issues of affective learning, arguing that a positive emotional context encourages the learner to engage in the process of creating meaning; the responsibility for creating this context falls upon both learner and educator, and Novak spends an entire chapter discussing the characteristics of an effective teacher/manager. He also emphasizes the constructivist nature of human knowledge in contrast to a purely positivist epistemology; Ausubel’s theory, according to Novak, recognizes that human knowledge is inflected by perspective and allows for productive collaboration between individuals with different worldviews.

This theory serves as the basis for Novak’s promotion of the “concept map” as a tool of meaningful learning. Readers familiar with “mind maps” will recognize something of their structure in concept maps. While both provide a visual representation of concepts and their linkages, mind maps are nebulous in organization, looking like an illustration of a game of word association. Concept maps are hierarchical and logical in nature; ideas are connected by clear, functional propositions that define their relationships, with higher order concepts subsuming lower order ones. If mind maps are useful for initial brainstorming, concept maps are geared toward later reflection and analysis. According to Novak, the creation of concept maps enacts the process of meaningful learning—the learner sees new connections and gains new insights into their knowledge in the process of organizing it—and reflects back to the learner the product of the learning process in a sophisticated yet easily readable visual artifact that can be further developed over time.

Novak employs concept maps throughout the text, beginning with fairly simple maps that are little more than the visualization of a sentence and proceeding to far more sophisticated ones that map out the relationships between job functions in large institutions or articulate elaborate scientific concepts. He effectively demonstrates the flexibility and usefulness of concept maps for helping individuals and groups to organize and construct knowledge, and while his examples are primarily business or science oriented, it is not difficult to see how they can be applied to a variety of subjects (free concept mapping software available at http://cmap.ihmc.us). Novak is less successful in his promotion of the Vee diagram, a more baroque form of visual knowledge organization that seems geared primarily toward the development and analysis of scientific experiments. Their applicability outside of the sciences is less apparent, and Novak admits that they require a great deal more training to understand and construct than concept maps.

There is much in Novak’s work that is enlightening and useful for educators and business managers. The concept map tool is powerful and almost immediately useful; Novak provides many examples and a helpful guide to constructing concept maps. While educators will need to reflect seriously on how to incorporate them into their teaching, many will recognize the long-term benefits to be gained from their initial effort. Particularly intriguing, although requiring the most work on the part of educators to implement, is Novak’s discussion of alternative modes of assessment. He omits many practical specifics about the use of concept maps to evaluate student learning, but he effectively demonstrates the limits of most traditional forms of testing. And although Novak is very optimistic about the possibilities for educational reform, he recognizes the profound difficulties facing any change. The strength of his theory is that it goes to the heart of these problems; rather than focusing on superficialities like low test scores, he challenges the very nature of learning assessment. He repeatedly points out the faulty assumptions that underlie modern educational methods and the various causes—social, political, economic—that impede change despite the growing recognition of a crisis in learning.

Despite these strengths, some of Novak’s assumptions bear closer scrutiny. Though he emphasizes the need for active negotiation between learner and educator and the importance of a positive emotional context, Novak also implies that a market-based approach to education can lead to significant reforms, and advocates for extensive cooperation between educational institutes and the corporate world. This ignores the recent evidence that the “education as business” mindset can impair learning and that the profit motive often leads to corporate exploitation of schools and students (Bousquet 2008; Newfield 2011; Slaughter and Rhoades 2009; Tuchman 2011). Perhaps the strangest assertion that he makes is that the humanities and social sciences “lack [a] focus on conceptual understanding” compared to the so-called “hard” sciences (Novak 2010, 199). His proof for this claim is that “few concept maps dealing with the humanities or social sciences can be found in the hundreds of thousands of concept maps on the CmapTools server . . . other than for the field of psychology.” This is very thin evidence for such a dismissive and potentially alienating comment; a simpler explanation is that Novak and his team have focused their research and implementation efforts on the hard sciences and have not yet worked with educators in the humanities and social sciences on how to develop teaching methods using concept maps. Such comments suggest that Novak himself is unaware of the nature of the kind of work done in these disciplines, particularly at the higher levels.

Novak’s methods do possess great potential for use in disciplines outside of the sciences, but effective dissemination of his ideas will require him and others to consider new applications and adaptations. The limitations of Novak’s theory also must be examined; the humanities in particular can offer positive and theoretically sophisticated critiques that can expand the goals and reach of his work. Such research will be difficult, but its importance
cannot be overstated. For all its faults and blind spots, Novak’s book accurately identifies the fundamental problems of the education system, particularly in the United States, problems that will have profound implications for the social, economic, and political future of the international community and thus must be faced sooner rather than later.

REFERENCES


