CONSTRUCTIVISM and Active Learning

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Constructivism, and its close relative, discovery theory, is an offshoot of cognitive theory that proposes learning will occur as a person actively processes information to construct solutions to problems. Literature on cognitive theory is quite extensive concerning the education and learning in children, much of it written from a child psychology point of view or starting point. In more recent years, educators have been expanding the principles to higher education.

Almost from the moment we are born, we begin to learn, absorbing information, and, eventually drawing conclusions about, i.e., learning, how the world around us behaves. Watching this process in very young children can be among the most amazing and rewarding experiences for new parents. For decades, cognitive theorists have proposed many explanations for how children learn from a very young age. The understanding of this learning process could then possibly be applied to learning at any age. The "natural" process by which a child learns, without any training at all, ought to be applicable to a trained mind as well.

The basics of cognitive theory are considered to have begun with John Dewey (1933/1998). In the mid- and latter-twentieth century, Jean Piaget and Jerome Bruner were among the leaders in forwarding the constructivist subset of cognitive theory. Bruner posited that discovery leads one to become a constructionist (Anglin, 1973). Processing stimuli from a problem that has been presented and working to a solution fundamentally lead to learning in the problem solver. Learning occurs as the solution is discovered. This learning requires that certain facts must already be known, but the discovery leads to new insights concerning the relationship between various facts that are known.

Though the ideas of constructivist theories were developed with respect to child development, more recent innovators in education and even in industry have applied the principles of constructivist theory. The principles of using discovery for learning pervade active learning (e.g., Harris and Johnson, 2002), action-learning (Marquardt, 2004), and some aspects of learner-centered learning (McCombs and Whisler, 1997). Integrating inquiry into the teaching and learning process is another manifestation of the constructivist principles (Audet, 2005). Although some of the words associated with the theory, "discovery", "action", may imply a hands-on approach, this need not be the case. As Audet (2005) says, the process, "the attempt to draw meaning from experience," is the important step for learning. This applies whether working with hands-on, experimental science or trying to learn from the lessons of history. Attempts to integrate the constructivist principles into real, appropriate, and useful methods of instruction and curricula continue, with the North Central Regional Education Laboratory's

“thinking curriculum” as a modern example (NCREL, 2004). At the collegiate level, the incorporation of thought process and inquiry in large and small group projects and using specific case studies to drive the learning also spring from similar principles (MacGregor, 1990).

All of these propositions for learning put the onus on the learner to go through the process of linking facts and drawing conclusions that are logical. However, issues may arise in a classroom when various environmental factors, including age, background, or culture, differ from individual to individual, potentially causing different conclusions from the same information. American teachers, particularly in the public school system through secondary education, are continually criticized (whether justifiably or not) for not taking such factors into account during instruction when students fail to do well in school (Zoch, 2004). Whether in response to such criticism or not, teachers, therefore, can benefit greatly from being able to identify what sort of activities may be useful in leading a particular group toward learning by constructing their own answers.

One can extrapolate the constructivist and discovery methods from the conventional student to the teacher desiring to learn more about teaching (Haury and Rillero, 1994). Learning to teach, as any learning, can be accomplished by knowing certain facts about teaching (and necessarily about one’s students) and then discovering how they may combine into a useful instructional method. When one considers that invariably some component, namely the student population, of the teaching (i.e., learning) environment will change every year, the process of discovery may be never-ending for teachers. Unfortunately, the process of discovering solutions, for teachers, is difficult, though not impossible, to achieve without actual classroom time with actual students. In this sense, the adage that the teacher may learn as much as the students may be very true.

The emphasis and time spent by teachers on instruction techniques is not without its critics, especially when school standards and results in the United States are as poor as they are (as national averages) compared to international peers. The intense individual study and memorization characteristic of several international programs seem to result in better education based on standard test data. However, when comparing data investigating the ability to think through problems, the gap in performance decreases (Zoch, 2004). If the goal of education is to enable student to be able to formulate solutions to problems, constructivism and its many manifestations seems to provide a very strong resource for teachers in the face of every-changing and more demanding environments.

From various literature sources, there are many practical and usable techniques for implementing constructivist methods in the classroom. From a purely pragmatic standpoint, such methods seem to present two main challenges to implementation. First, discovery at its core requires an inquisitive, i.e., motivated, mind. While the presumption is that well-planned projects, in and of themselves, would provide motivation for inquiry, at least in most students, this is not at all a foregone conclusion. As a result, the second challenge is the time required by the instructors to develop and prepare meaningful and ‘motivational’ projects. Thus, without motivation on part of the instructor, the time required may be prohibitive.

Constructivist, as well as other, models for instruction that attempt to get students more actively involved in their own learning have attracted much attention in recent years as possible solutions to perceived and real lapses of the education system in the United States. In various guises, the principles of such instruction are viable at every level of education, particularly when the end state of education is a person not only full of knowledge but also capable of drawing conclusions and solving new problems.

References

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Annotated readings:

Anglin, J. M., (ed.) (1973) *Jerome S. Bruner: Beyond the Information Given*. New York. W W Norton & Company, Inc.
This collection of papers and presentations by Jerome Bruner is a great place to start for the theory behind constructivism. Though they are presented mainly from a child psychology point of view, they are well written and most are fairly easy to read and understand. Since each one is relatively short, they do not have to be read all at once and the topics can be chosen at the reader's discretion.

Audet, R. H. & Jordan, L. K. (ed.) (2005) *Integrating Inquiry Across the Curriculum*. Thousand Oaks, California. Corwin Press.
This compilation of short essays is a great starting point for practical ideas in a variety of subject areas. A number of different strategies are presented for incorporating active learning

into the classroom as well as techniques that make any classroom a more interesting place to be.

Marquardt, M. J. (2004) *Optimizing the Power of Action Learning*. Palo Alto, California. Davies-Black Publishing.
This is a very interesting take on many of the constructivist and active learning principles applied to an industry setting as opposed to a classroom. Instead of a teacher, the perspective of a leader or manager in a company is used often to illustrate how one's subordinates might be motivated on a given project and learn through the process of solving real-world problems.

McCombs, B. L. & Whisler, J. S. (1997) *The Learner-Centered Classroom and School*. San Francisco. Jossey Bass.
This book is a comprehensive look at the learner-centered concept for teachers. There are some active learning tie-ins, mostly where the authors talk about keeping the classroom interesting and motivating for students. Oriented more toward elementary and secondary, rather than collegiate level teachers, much of it may seem over the top for interaction and interest in students. However, it is a good reminder of the diversity that all American classrooms deal with.

Svinicki, M. D. (ed.) *The Changing Face of College Teaching*, Number 42. San Francisco. Jossey Bass.
This edition, and I suspect the entire series, is a collection of excellent short essays and papers on a wide range of topics very applicable for college teachers. From the importance of writing to the need to continue to study teaching itself, all of the contributions to this issue are very relevant and most offer some very good practical advice.

Zoch, P. A. (2004) *Doomed to Fail: The Built-in Defects of American Education*. Chicago. Ivan R. Dee.
This is a somewhat scathing review of the American education system, particularly in public schools, and the extraordinary onus that is placed on American teachers when students fail. Comparisons are made to the education systems of other countries, with attention paid to differences in cultures. This should be read by every parent who ever blamed a teacher for a student's failure.