Instructional design for meaningful learning

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Abstract. The instructional design and student learning literature is reviewed for guidelines for instruction which would encourage deep rather than surface learning. A taxonomy is presented which values student conceptions of key phenomena and skills for the self-discovery of knowledge as more important than the accumulation of information. Strategy elements suggested for the selection and sequencing of content, therefore, focus on revealing the interrelationship between key concepts. Evidence is presented of the persistent nature of existing conceptions and the difficulty of changing conceptual frameworks. Diagnostic questions are suggested as a means of exposing existing conceptions. It then seems necessary to provide a challenge to revealed or anticipated misconceptions so that students pass through a disequilibrium phase before re-forming their existing conceptions. As there is growing evidence of a mis-match between the goals and practice of teachers, action research is suggested as a method of implementation.

Does instructional design address meaningful learning?

The student learning movement has influenced the thinking of many educators. The concepts of deep and surface approaches to learning have struck a particular chord, in many instances giving expression to concerns which have been latent or undefined for some time. Although there is no universally agreed definition of the terms deep and surface, Biggs (1987, p. 15) believes that there would be wide agreement that a student who adopts a deep approach:

- is interested in the academic task and derives enjoyment from carrying it out;
- searches for the meaning inherent in the task (if a prose passage, the intention of the author);
- personalizes the task, making it meaningful to own experience and to the real world;
- integrates aspects or parts of task into a whole (for instance, relates evidence to a conclusion), sees relationships between this whole and previous knowledge; and
- tries to theorize about the task, forms hypothesis.

A student who adopts a surface approach:

- sees the task as a demand to be met, a necessary imposition if some other goal is to be reached (a qualification for instance);
• sees the aspects or parts of the task as discrete and unrelated either to each
  other or to other tasks;
• is worried about the time the task is taking;
• avoids personal or other meanings the task may have; and
• relies on memorization, attempting to reproduce the surface aspects of the task
  (the words used, for example, or a diagram or mnemonic).

Many teachers now recognise the desirability of their students adopting deep
rather than surface approaches to study.

However, as one who in various career stages has been labelled as an
instructional designer, I have become concerned that books classified as about
instructional design generally show little cognisance of the research into student
learning and contain little which would help a teacher who wanted to design
instruction which facilitated deep rather than surface learning. This is obviously a
sweeping statement, but appears to be backed by assertions by Reigeluth, the
editor of *Instructional design theories and models* (1983a). In an analysis of the
current status of instructional design, Reigeluth (1989, p. 74) admits that instruc-
tional theorists have largely ignored learning characterized by understanding and
developed relatively little in the way of validated prescriptions for facilitating
understanding. It is possible to argue with this assertion by adopting an alterna-
tive stance on what are, or are not, instructional design theories. Similarly with
the assertion in a recent review of instructional design theories (Merrill, Li and
Jones, 1990) that current instructional design theories are firmly rooted in behavi-
oural psychology. However, it is clear that comprehensive instructional design
prescriptions have been easier to derive from earlier behavioural theories than
from constructivist theories of cognitive psychology (e.g., Schuell, 1986) or
research into student learning, which has recognised the desirability of promoting
meaningful learning.

Indeed there has been some debate about the extent to which it is possible or
desirable to make generalisations from phenomenographic research (Marton,
West (1986) identified alternative positions held by the “phenomenographers”,
who focused on research into the learning of their own students, and “positivists”
who were more willing to make generalisations. Marton (1986) reflected on the
questions discussed at the Symposium and concluded that:

“... we cannot make predictions in the strict sense in the field of educational
and psychological research into learning except in the negative form (if -A
then -B). We can, however, still make theoretical constructions involving rela-
tions between conditions, perceptions and actions. The concrete meanings of
these constructions must, however, once more be found out in each concrete