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Reclaiming Instructional Design

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Education and its related disciplines continue to flutter this way and that by every philosophical wind that blows. In an uncertain science and technology, unscientific theories flourish. People are anxious for answers. When answers are slow in coming, uncertain in statement, and difficult to find; then the void is filled with wild speculation and philosophical extremism.   This brief statement attempts to make clear our belief that instruction is a science and that instructional design is a technology founded in this science. We attempt to identify some of the assumptions underlying the science-based technology of instructional design, and to clarify its role in the larger context of education and social change.

The Science of Instruction and the Technology of Instructional Design

- There is a scientific discipline of instruction and a technology of instructional design founded on this science.

- Like all science, the science of instruction is based on specific assumptions about the real world.

- The technology of instructional design is founded on scientific principles verified by empirical data.

- Like other sciences, instruction is verified by discovery and instructional design is extended by invention. Instructional science, the foundation for the technology of instructional design, is the discovery of instructional strategies. Instructional science involves identifying the variables to consider (descriptive theory), identifying potential relationships between these variables (prescriptive theory), and then empirically testing these relationships in the laboratory and the field.

  The development of instructional design procedures and instructional design tools, the technology of instructional design, is invention. The technology of instructional design, like other technologies, is not a natural phenomenon. It is man made, designed to serve our needs. Design research involves inventing procedures and processes which incorporate what we learn from instructional science.   These instructional design procedures are not governed by any natural laws. They are developed by creative invention to make them work better. However, they must incorporate those scientific principles involved in instructional strategies, just as the invention of the airplane had to incorporate the discovered principles of lift, drag, and flight. It was not until the Wright brothers discovered the correct principles of aerodynamics (science), that they could invent an airplane that would sustain powered flight (technology); it is not until we discover the correct instructional strategies that we can invent instructional design procedures and tools that will promote student learning.

- Instructional science is concerned with the discovery of the natural principles involved in instructional strategies; and instructional design is the use of these scientific principles to invent instructional design procedures and tools.

Those persons who claim that knowledge is founded on collaboration rather than empirical science, or who claim that all truth is relative, are not instructional designers. They have disassociated themselves from the technology of instructional design. We don't want to cast anyone out of the discipline of instructional science or the technology of instructional design; however, those who decry scientific method, and who deride instructional strategies, don't need to be cast off; they have exited on their own.

Instruction and Learning

- Instructional design is a technology for the development of learning experiences and environments which promote the acquisition of specific knowledge and skill by students.

- Instructional design is a technology which incorporates known and verified learning strategies into instructional experiences which make the acquisition of knowledge and skill more efficient, effective, and appealing.

- While instruction takes place in a larger organizational context, the technology of instructional design is concerned only with the development of learning experiences and environments, not with the broader concerns of systemic change, organizational behavior, performance support, and other human resource problems.

- Instruction involves directing students to appropriate learning activities; guiding students to appropriate knowledge; helping students rehearse, encode, and process information; monitoring student performance; and providing feedback as to the appropriateness of the student's learning activities and practice performance. Instructional design is the technology of creating learning experiences and learning environments which promote these instructional activities.

Students and Learners

- *Students* are persons who submit themselves to the acquisition of specific knowledge and skill from instruction, *learners* are persons who derive meaning and change their behavior based on their experiences. All of us are learners, but only those who submit themselves to deliberate instructional situations are students.

- Learners today are <u>not</u> significantly different from those of a decade ago, a generation ago, or a century ago. The basic learning mechanisms by which learners acquire knowledge and skill have remained constant amid societal change. While far less understood, the science of instruction is just as stable as the science of biology, physics, or chemistry. The principles of biology do not change with changes in society; neither do the principles of learning and instruction.

Individual Learning

- Groups don't learn, individuals learn. Learners may be part of a group while learning, learners may learn from one another, and the social context of a learning environment may provide support for its members; nevertheless the change in cognitive structure and the acquisition of knowledge and skill is an individual event.

- A student cannot learn without individual practice which is the demonstration of their knowledge or skill.

Knowledge and Skill

- There is a body of knowledge and skill that has been developed and archived by generations of scholars, scientists, technologists, artists, and others. The purpose of instruction is to enable students (novices) to acquire this knowledge and skill. The purpose of instructional design is to develop experiences and environments which facilitate the student's acquisition of this knowledge and skill.

Instructional Principles

- There are known instructional strategies. The acquisition of different types of knowledge and skill require different conditions for learning (Gagné, 1985). If an instructional experience or environment does not include the instructional strategies required for the acquisition of the

desired knowledge or skill, then effective, efficient, and appealing learning of the desired outcome will not occur.

- These instructional strategies (conditions of learning) can be verified by empirical test.

- Appropriate instructional strategies can be discovered, they are not arrived at by collaborative agreement among instructional designers or learners. They are natural principles which do exist, and which nature will reveal as a result of careful scientific inquiry.

Many persons associated with educational technology today are engaged in a flight from science. Instruction is a scientific field and instructional design is a technology founded in this science. Instructional design is not merely philosophy; it is not a set of procedures arrived at by collaboration; it is a set of scientific principles and a technology for implementing these principles in the development of instructional experiences and environments.

Conclusion

Too much of the structure of educational technology is built upon the sand of relativism, rather than the rock of science. When winds of new paradigms blow and the sands of old paradigms shift; then the structure of educational technology slides toward the sea of pseudo-science and mythology. We stand firm against the shifting sands of new paradigms and "realities." We have drawn a line in the sand. We boldly reclaim the technology of instructional design that is built upon the rock of instructional science.

There seem to be a lot of people associated with instructional technology who don't seem to know where they are going. Neophytes who are pursing instructional technology are lured this way and that by the varied philosophical voices crying lo here. They need a sign post; at least they need to know that there are persons who strongly support a science-based alternative.

In conclusion may we cite a passage from Lewis Carroll.

"The cat grinned when it saw Alice. It looked good-natured, she thought: still it had very long claws and a great many teeth, so she felt that it ought to be treated with respect.

" 'Cheshire Puss,' she began, rather timidly, as she did not at all know whether it would like the name: however, it only grinned a little wider. 'Come, it's pleased so far,' thought Alice, and she went on. 'Would you tell me, please, which way I ought to go from here?'

" 'That depends a good deal on where you want to get to,' said the Cat.

" 'I don't much care where –' said Alice.

" 'Then it doesn't matter which way you go,' said the Cat.

" '—so long as I get somewhere,' Alice added as explanation.

" 'Oh, you're sure to do that,' said the Cat, 'if you only walk long enough.' "

It is possible to know where we are going. We still have a long way to go, but abandoning the path of scientific method and following the uncertain wilderness of philosophical relativism will distract us from our goal and unnecessarily delay our journey.

Reference

Gagné, Robert M. (1985). *The Conditions of Learning and Theory of Instruction, 4th Edition* Holt, Rinehart and Winston.