Instructional Technology And Its Exigency

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Abstract

In the last decade of the twentieth century a restitution of a once outdated definition of Instructional Technology (IT) is observed, which emphasizes the use of technologies in instruction, and ignores the instructional technology aspects of it. Why should IT as a field of study (a discipline), as an approach to instruction, and as a necessity for today's educational settings be used? Is IT the mere use of new educational technologies in instruction or a systematic way of dealing with instructional problems that comprise the use of new technologies in instruction? Is there a way of abandoning IT in all or some instructions, or is IT a necessity for all instructions? These questions, in writer's view, are of prime importance in a time of facing vital problems and decisions about the future of our school system and the way we are going to handle our instructional processes within schools.

The limitation of 'time' allotted for instruction becomes evident in two forms: first, the limitation of man's lifespan, and second, the limited time of instruction that is allotted in 50 minute time slots. Considering these limitations, choosing to learn something is meant to exclude others, and people by choosing an aim or a topic in fact deprive themselves from other aims and topics; there is a real competition between aims and topics of instruction.

One way of dissolving this problem is to chose the 'best' or the 'most important' topics to teach/learn, but, redundancy and superfluity of knowledge with an increasing rate makes the task of choosing the topics more difficult.

Another way of resolving the problem of limited time is to increase efficiency of instruction in a given time limit. It is obvious that this solution does not resolve the problem completely either, but this is the only remaining path open to man, and the reason for renewed interest in IT. A discussion about the meaning of IT is in order.

Definition of Technology

Technology is composed of two terms; 'technique' and 'logy'. Technique means 'a skillful way of doing something', and the suffix 'logy' means knowledge and knowing (Webster's Dictionary, 1994). The two terms put together mean; knowledge of skillful ways of doing things.

Hence Technology in any discipline is the knowledge resulting from studies and explorations in that discipline for achieving the ways of skillfully doing the things subject to that discipline. Technology in any discipline is based first, on theoretical findings, and second, on practical and applied conclusions of that discipline in order to prepare the grounds for applying those findings to resolve problems in that particular context.

Definition of Instruction

Instruction is a conglomeration of decisions and activities that are made and carried out in order to procure the desired outcomes for learners. Some of these decisions and activities are as follows:

- examination of learners prior knowledge,

- determining the structure and combination of learning materials,

- use of incentives and feedback,

- determining the required capabilities for the desired learning outcomes,

- identifying required learning conditions,

- identifying ways of measuring learning outcomes,

- determining presentation strategies,

- determining the time necessary for learning,

- informing learners about learning goals,

- communicating with the learners,

- providing the learning materials,

- setting appropriate standards for performance and evaluation,

- managing the learning processes, and …

The above list is by no means intended to be complete, rather the point is that instruction is a multifaceted and complex process, which needs to be studied and dealt with as a unique and goal-oriented process.

Definition of 'Instructional Technology'

Considering the definitions of Technology and Instruction a comprehensive definition for IT would be; the knowledge of skillful execution of instruction. This knowledge is an applied knowledge that is bound to specific conditions and circumstances. In other words, IT is one of man's applied knowledges that looks at instruction as a systematic and cohesive process. It presents solutions, strategies, procedures and models for execution of instruction for different learners and in a variety of conditions.

There are a number of doubts and questions about IT that hinder or limit its efficiency and use. Some of the more important questions about IT are as follows;

1. Is IT aiming at implementing the principles of behavioural theories of learning?

2. Does implementing IT principles result in mechanized and dehumanized instruction?

3. Does IT fulfill all of our instructional needs?

In response to the first question, as was mentioned above, technology in a given discipline is based on the latest applied findings of that discipline, and it is obvious that the latest findings of research about learning are limited to the behavioural approach (up to late 1950s) in IT. IT was afterwards heavily influenced by the findings of cognitive psychology (a movement that started at the beginning of 1960, and continued through late 1980). Therefore believing that IT is the product of application of behavioural psychology to instruction would not be true, because IT by its nature is bound to use existing research findings in solving instructional problems, and IT today benefits least from behavioural points of view.

The history of IT can be divided into two distinct periods; in the first period IT was studied with an instrumental connotation, which emphasized the use of new instructional media and materials in instruction. This conception of IT did not last long, and diminished with the decline of behavioural psychology at the late 1950s, and this was the beginning of the second period which was marked by theories of cognitive psychology.

A new definition of IT that emphasized mental processes and cognitive analysis of learning tasks was born. The new approach to IT intends to solve instructional problems using all existing research findings, and in so doing does not see itself limited by any theoretical or psychological perspective.

The second question states that implementing IT principles results in mechanized and dehumanized instruction. It is useful to look first for the origins of the question, secondly, is posing this question from an educational theory perspective or from an instructional theory perspective relevant and thirdly, is the criticism relevant?

Re conceptualists such as Giroux, Penna and Pinar (1981) state that:

> …theorists such as James Macdonald, Dwayne Huebner, Maxine Greene, William Pinar, and Micheal Apple played a significant role in "re conceptualizing "the major issues, concerns, and modes of educational inquiry that provided a focus for curriculum theory and practice. Drawing selectively on such European intellectual traditions as existentialism, phenomenology, psychoanalysis, and neo-Marxism, … (p6–7).

Setting aside the issue of how did Americans manage to defeat the communist block on political, technological, and economical fronts, and give in to their cultural and philosophical offences, a discussion about the difference between educational theory and instructional theory is in order.

Theory is a coherent group of general propositions used as principles of explanation for a class of phenomena. Theory is more or less a verified explanation about known facts and phenomena. Kerlineger (1973) defines theory as' …a set of interrelated constructs (concepts), definitions, and propositions that present a systematic view of phenomena by specifying relations among variables, with the purpose of explaining and predicting the phenomena. It is notable that all definitions of theory refer to a class or group of objects, events, or phenomena which is specific to that theory, and is added to the term 'theory' such as 'educational theory'

or 'instructional theory'. Therefore educational theory can be defined as an aggregate of constructs (concepts), definitions and propositions that explain the interrelationships between these constructs, definitions and … to provide a systematic view which enables one to explain, predict and anticipate all those events and phenomena subject of that theory.

In an educational theory topics such as ontology, epistemology and axiology in a broad and philosophical sense is discussed. Education as a field of study is composed of a diverse range of topics, and a theory of education must encompass the whole range of topics in its most general sense. Hence, most of the works of famous educational theorists are about the main issues of philosophical significance in the field of education.

On the other hand, instructional theory could be defined as a set of constructs, concepts, definitions and propositions that explain the phenomena or process of instruction with a systematic perspective. As was mentioned above instruction is the set of decisions and actions that are made or executed for achieving the goals of instruction by the learner. Considering this definition an instructional theory is an organized set of constructs (concepts), definitions, and propositions about the process of instruction, with which one can achieve an explanation of phenomena existing in those decisions, actions, and the relationships between them in order to explain and predict those phenomena and their consequences. In other words, and according to Reigeluth (1983) an instructional theory is the systematic relationships among three key elements of outcomes, methods, and conditions. In an instructional theory we have very specific and concise propositions declaring specific relationships between two or more concepts or constructs specific to the domain to which the theory belongs to. For example, in an instructional theory teaching procedural tasks consists of presenting the way of execution of the procedure, practicing the procedure by the learners, and providing them with feedback about their performance. This is a prescriptive proposition taken from an instructional theory.

There are at least two kinds of theories, based on their domain of reference, strong theories, and weak theories. Strong theories as far as possible encompass all the concepts, definitions, propositions and phenomena within a domain, while weak theories comparatively encompass fewer phenomena or propositions. For example, some of the instructional theories prescribe comprehensive propositions and principles about presentation of instruction for all kinds and categories of educational objectives (e.g.; Instructional theory of Gagne and Briggs, 1992). Other theories prescribe only the principles for limited kinds of educational objectives (e.g. Merrill's Component Display Theory, 1983) which is limited to cognitive objectives.

By comparing the definitions of educational theories and instructional theories, it becomes evident that educational theories are general, and encompass all significant or key phenomena which have a key role in education with a philosophical and general approach. Instructional theories, concerning their domain of reference are more limited and deal only with the phenomena related closely to 'instruction'. Therefore, it could be concluded that educational theories are general and widespread, and instructional theories are specific and piecemeal.

The noticeable point is that the two kinds of theories do not overlap, and their domains of reference are longitudinally ordered, and not cross-sectional. In other words, the general and broad theories of education deal with the philosophical and general educational concepts and phenomena, and might have some hints or references about instruction and teaching. However, these hints and references do not suffice for the kind of explanations necessary in instructional theories. There is a big difference between general and philosophical explanations of educational phenomena, and specific and causal explanations of instructional processes.

Considering the above differences between educational and instructional theories, and what re conceptualists have to say about education, we might be able to conclude that re conceptualists in the position of a philosopher and an expert in 'education' have some attendable and thought provoking discussions about philosophical, historical, and sociological aspects of education, and their discussions about instructional topics can not be taken seriously.

A quotation from Dwayne Huebner (1981) speaks for itself:

> '… some of the implications of this analysis for curriculum and our 'understanding' of human development are easy to generate. If we take seriously the possibility of a genetic Marxism, then further inquiry might produce more useful knowledge about the dialectical relationship between adults, the structures of the adult world and the child. Central to such inquiry would not be cognition or affect but the shape of human activity throughout the lifetime of the person, the developing power of the person for self and social production, the evolving social relations of the person, the relationship of self activity to social activity, the evolving functions of language as a manifestations of social relations and consciousness, including class consciousness, the functions of production and ownership, and the use value of the materials of production for children, the relationships of these materials to the schemata of assimilation and accommodation of the child, and the relationship of these materials to the productive forces within the society.' (p135)

This is just one of the voluminous neo-marxists' writings about education, which has no direct and clear relationship to instructional issues. As another example, review the quotation from William Pinar (1981):

> '… a re conceptualist tends to see research as an inescapably political as well as intellectual act. As such, it works to suppress or to liberate not only those who conduct the research and those upon whom it is conducted, but as well those outside the academic sub culture. Mainstream social science research, while on the surface seemingly apolitical in nature and consequence, if examined more carefully can be seen as contributing to its dissolution. Apple and Marxists and neo-Marxists go further and accept a teleological view of historical movement, allying themselves with the lower classes, whose final emergence from oppression is seen to be inevitable.' (p 93)

It is obvious that no instructional theory and even no educational theory can be derived out of such broad and general slogans.

The third question about the fulfillment of all our instructional needs by IT, it must be said that to this time, and in no field or discipline no technology has been arrived at which could satisfy all of man's needs in any known domain, and therefore having extraordinary expectations about IT is not meaningful and logical. But, since IT is the only practical and feasible way of going around instructional problems, and increasing the efficiency of class hours is of prime importance, there remains no other alternative but to invest all of our potential to improve IT principles and applications.

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