

Educational Technology and Teacher Education

—How Educational Technology Can Contribute
to Improve Teacher Education—

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1. Objectives for Teacher Training Programs

(1) Teacher's Work

A female student teacher might be asked by her mother, "What is a teacher?" She might answer, "Well, a teacher is ...a lecturer, discussion leader, actor, baby sitter, bookkeeper, referee, tour guide, counselor, nurse, cashier, audiovisual specialist, projectionist, measurement specialist, test proctor, secretary, policeman, social worker, ..." The mother might smile and say to her, "The teacher's work I understand, is very similar to a housewife's in that it includes more complexity and diversity than any other work in society." The tasks before us are how we train teachers, in terms of educational technology, and how we prepare educational programs that will meet the basic requirements for the complexity and diversity of the teaching profession.

Suppose we try to prepare a computer program to train teachers by which they can acquire the knowledge and competence to become "good" teachers; what should we put into this program? If the end-products of learning processes can be precisely defined, then it can be said that students are being trained. Even if the end-products are complex behaviors, and accordingly difficult to specify, they should

be, even in the forms of their approximations, defined in some ways.

Teacher training institutions are offering foundation courses such as philosophy of education, educational psychology, sociology, and curriculum. These courses have made little or no effort to specify the end-products in terms of behavior which the teachers are expected to perform. In philosophy class, for instance, the assumption has been made that if prospective teachers understand some of the educational thoughts and practices, they will be able to use this understanding in future school activities. Similar assumptions are found in educational psychology, sociology and curriculum courses. These foundations are usually of an introductory nature, and provide the students with the very basis of thinking in education, but are of less benefit for helping the students develop specific competence and skills that will be directly useful and relevant to teaching.

(2) Educational Technology as a Systematic way of Thinking

Educational technology seems to be best defined as a concept and a method reflected in the attitude of teachers who address themselves to means-ends relationships. Probably, the means are instructional processes and the ends are the learning outcomes or end-products of students. The most difficult task faced by educational technologists is the introduction of this form of thought into contemporary educational practices, including teacher education, where the relationships between means and ends are rarely considered.

It has been commonly understood that educational technology is a systematic and scientific approach to education, not the mere introduction of newer media of instruction or hardware technology. However, few faculty members at any level of schools think in terms

other than hardware technology. Some teachers tend to be and often proudly, “anti-technology.” In their minds “technology” means mechanization, dehumanization, and automation. Their claims to knowledge about instruction come from what they conceive as a “humanistic” position as opposed to a “technological” position. The use of well-defined instructional objectives might be an answer to this opposition.

For the past decades educational technologists have been emphasizing that teachers should formulate specific and behavioral objectives of instruction. However, it is not an easy task to define them, and furthermore, the objectives of the courses in higher education, including teacher education programs have rarely been formulated precisely.

Students learn from interaction with their natural, cultural, and social environment. There is no magic way by which a teacher can pour learning into the brain of a student. Teaching is always indirect. Teaching is only to facilitate students to learn. Furthermore, teaching is to provide students with external environments in such a way that their on-going learning processes are facilitated and directed. The school is an intensively institutionalized learning environment, where certain learning outcomes are more likely to occur than in the natural environment. Within the school there are two basic environments. The first consists of the student's interaction with other persons—other students and teachers. This might be best characterized as the “social environment” of the school. Much of what a student learns in a school results from his interaction within the social environment.

The second kind of environment consists of various stimulus situations designed to bring about particular learning outcomes. This

environment consists of lectures, discussions, various types of media such as books, charts, and pictures. These media are all selected and arranged in such a way as to facilitate and direct the learning experiences of students toward particular directions and for specific behavioral changes. This environment might be characterised as the “instructional environment” of the school. The teacher has a particular responsibility to handle both of these environments to make them as effective as possible for the students. It is then possible, based on the above observations, to identify certain competence and skills which are likely to facilitate a teacher’s performance both in social and instructional environments. It will become therefore possible to formulate instructional objective for teacher training programs in terms of the competence and skills teacher necessary for the school environments.

(3) Management of Social and Instructional Environments

It is possible to identify certain needed skills of teachers in the social environment of the school. They are characterized as social interaction skills consisting of two types. The first are those skills of personal relationships that enable a teacher to establish personal communication with her students. The second are those skills needed to promote communication between students. In order to perform well in this environment teachers are required to know the important determinants of human communication processes and group dynamics, and to manipulate these determinants to promote group processes which will facilitate desirable learning outcomes of students. Interaction analysis, for example, is a good training device to help teachers acquire the competence and skills needed to manage the social environment. The

Flanders' type of interaction analysis system is a concise set of dimensions for describing the way a teacher interacts with students in her class. With an appropriate training technique like the Flanders' system, it is possible for teachers or prospective teachers to improve and acquire many social interaction skills.

The stimulus materials comprising the instructional environment of a school are obtained from many sources. All of these materials provide the students' external environment consisting of instructional media. Numerous varied instructional media are now used in the schools. Even where the teacher's initiative predominates, school broadcasting of the "direct-teaching" type, programmed instruction and other items have also come to be used in classrooms as independent instructional media offering a self-contained learning environment, although they do not always affect the teacher directly. The media which form the instructional/learning events are extremely diversified. The lecture by a teacher is itself still a powerful instructional medium. But in addition there are new instructional media such as slides, movies, radio, television, programmed instruction, VTR, CAI, exhibits, demonstrations, which permit individual students to study through methods most suitable to themselves. Furthermore, modular scheduling and team teaching based on these media have not only become possible but can carry out instruction more efficiently. The systematically prepared instructional environment has become so diversified that it is now possible to develop concrete methods for handling the needs of each individual student.

The freedom available to the teachers to select the most appropriate instructional environment has increased greatly. On the other hand, teachers as an instructional medium can go beyond their traditional

role and improve instruction by deciding how to prepare and offer the instructional events most suitable to their students. In other words, the major role of the teacher will change from that of being a medium to that of designer or manager of the instructional environment.

A teacher is almost always seen in front of a group of students, explaining to or discussing with the group. It is not surprising that the attempts at training skills which exists in teacher education programs consist almost exclusively of training for instructional communication. The lesson plan is really a method for organizing a presentation rather than the design for an instructional environment. Most student teaching programs usually concentrate on the teachers' instructional communication skills. In spite of the role change, from medium to designer, observed in contemporary schools, very little change has been reflected in teacher education programs. Very few attempts have been made to meet the new needs in the schools.

2. Competences and Skills Designing Instruction

A. A. Lumsdaine has identified some of the historical roots that have merged into the "tree" of instructional design:

- a. heritage from both psychology and education of interest in individual differences among learners, including the use of self-paced instructional devices and teaching machines, similar "job" training devices or simulators as used in military and industrial training
- b. behavioral science learning theory, emphasizing either reinforcement of correct responses or guidance for cognitive activities
- c. engineering technology compatible with self-paced individualized

learning

d . the audio-visual field as employed in education and elsewhere

There have been several attempts to outline the major competence and skills required for designing instruction. Effective instructional design might include the following elements:

- a . formulation of instructional objectives
- b . preparation of assessments of learners' performance
- c . assessment of learners' characteristics such as physical, scholastic, psychological and social status
- d . competence in the analysis of objectives and content of instruction
- e . sequencing of instructional content
- f . identifying instructional events or environments
- g . selection of instructional media
- h . competence in procuring and interpreting feedback from the learners
- i . evaluation of the instructional process

Instructional design generally follows the stages described above in terms of necessary competences for teachers. However, instructional design is not often employed by teachers in present day schools.

Although some researchers mention that behavior analysis and instructional design are beyond the capabilities of most teachers, a number of educational technologists believe that teachers can be trained to play the important role of instructional designers. It seems that prospective teachers could be trained to acquire the needed competences for designing instruction if the present introductory survey courses in the educational foundations required for the teacher's certificate were eliminated, and if the present emphasis were shifted from instructional communication skills (a teacher as a medium) to instructional design

skills (a teacher as a designer) in teacher training programs, prospective teachers under the new training system would be able to acquire the necessary skills for designing instruction.

3. New Trends in Teacher Education Programs

Teacher training institutions must innovate programs which emphasize the competences and skills most relevant to the new roles of teachers. The first cluster of proposed courses, providing teachers with needed skills in social interaction environments of the school, might include such components as group dynamics, interpersonal communications, discussion and procedures, and counseling. Each of the components is analyzed and divided into specific skills which represent the objectives of various units. Among the present academic discipline areas to form this cluster are mental health, personality counseling, social psychology, and educational methods. In these academic areas, the components of the social interaction skills are integrated and modified to facilitate the teachers' acquisition of the knowledge and skills needed in school situations.

The second cluster consists of those components providing teachers with competence in instructional designing. Some of the needed skills have been outlined before similar to the procedures for the design of instruction, the design skill course consists of a series of units or packages which enable teach academic areas relevant to this include, first of all, subject matter concentration and educational technology. The former provides teachers with understanding of the specific structures of their subject matter fields. The better the teachers understand a subject matter area, the more they can appropriately design instruction in that field. The latter, in addition to subject matter, provides teachers with

integrated and systematic knowledge and skills for designing instruction in terms of learning theories, measurement and evaluation, educational media, instructional strategies, and curriculum. In this area educational technology contributes much in its potential to improve teacher education programs. Its systems approach has substantially improved the methods for teacher training. A number of studies demonstrate that educational technology works well to help teachers understand desirable teaching behaviors in both social and instructional environments. A good deal of research has been conducted around three main areas in which educational technologists are assuming a major role: training teachers in interactional analysis, microteaching, and behavior modification.

These methods and techniques should be integrated in teacher education programs. The Japanese national and local governments have established a number of research and training centers, such as the Educational Technology center, the Curriculum Development Center, the Educational Research and Training Center, to promote improve and improve and implement teacher education programs in this country. Some of these conducting intensive surveys and experiments to formulate better methods and techniques for teacher training. Yet, little empirical research evidence to formulate the programs and methods has emerged, since instruction is a very complex process. Nevertheless these centers are seriously attempting to carry out research and to collect basic data.

It seems that teacher education programs have not changed significantly since the introduction of normal schools in Japan, and educational enterprise has been the last to adopt technological advancement in comparison with the enormous advancement of hardware and software technology in other sectors of our society. Unless teacher education programs are soon modified and innovated to meet the

emerging role of education, teacher education institutions may find themselves becoming obsolete.