



The Learning Systems Institute: Research Translation¹

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The Learning Systems Institute was one of the first new elements in Michigan State University's College of Education after John E. Ivey, Jr. became Dean. There is something about the Institute and its basic mission that reflects the sort of concern that John Ivey has for the field of education, and reflects vividly the plans and hopes he brings from his experience as a sociologist and as a social engineer. The Learning Systems Institute was created as one of two institutes in human learning. Ivey's postulate was that a college of education should be, above all other things, concerned about problems of human learning—a reasonable proposition inasmuch as schools are about the business of learning and teaching, and colleges of education are about the business of schools.

And yet, if you look about the country and examine schools of education and colleges of education, characteristically you find a fairly low emphasis on the field of human learning partly because schools of education tend to be considerably more related to the staffing and management of schools, not nearly so related to problems of individual learning. The second reason is probably that historically in American education in the 20th century, the function of the study of human learning has been largely in the domain of the psychologist and more recently of the sociologist and anthropologist.

Why this should give them squatter's rights on the whole area of human learning no one has really explained and, as a matter of fact, at Michigan State University, we feel that our task is to somehow collaborate with researchers in the several fields where people are looking at human learning, and to amalgamate these interests focusing them upon school-related problems of human learning. In order to achieve this collaboration, the two institutes were created. These institutes were created as department-level permanent additions to the College of Education. They are not groups simply pulled together for a given period of two, four or six years. In fact, the Human Learning Research Institute is a function of both the College of Education and the College of Social Science representing a multi-disciplinary research effort of psychologists, anthropologists, medical researchers, and people in social work and other areas concerned with the problems of human learning and social dynamics involved in the learning environment.

Frank Marzocco, formerly Director of Research for Systems Development Corporation (SDC) in Santa Monica, California, is the Director of the Human Learning Research Institute that was created to bridge the research and applied fields of problems in education. To the best of our knowledge, then, Learning Systems Institute (LSI) was the first educational engineering organization in a College of Education on a permanent basis in the United States and, at this point, several others are under consideration and under development in various places—but we still enjoy the status of the only permanent organization.

When the term “engineering” is used in relation to the LSI it doesn't refer to the mechanical operations of audio-visual instruction and the use of hardware. At LSI we use engineering in its original sense—the function of mediation between the basic sciences and the applied problem field.

¹ West Central Michigan Principal's Roundtable, March 23, 1966

So in our advanced culture there are a number of fields where engineers serve the function of bridging between basic data and applied problems. In education, we have wondered for quite a while why a gap exists between research and practice. It exists, in large part, because we have not taken seriously the need for people to perceive actively the problems of the real environment and to apply carefully and selectively data from basic research that leads to solutions.

The barriers to research in education are not very different from those in other fields, but some of them need to be pointed out.

1. First, researchers tend to be analysts. They tend to take things apart, find their smallest component, and describe that component. It is in the nature of researchers and their training: People who are basically curious, in the “Let’s take it apart” sense, end up as researchers. People who are concerned about “Let’s put it back together again somehow” end up as practitioners. In this sense, then, researchers are analysts and practitioners synthesize data and apply findings to problems. One of the major problems, then, is the communication barrier between the researcher and the practitioner in a field like education (and this is not unique to our field).
2. The second problem is typically created by the first: the barrier of disrespect. Practitioners may disparage researchers as “ivory tower” specialists with little real world sense; researchers may disparage practitioners as having little depth of understanding.
3. The third barrier in the research to practice gap is the barrier of language itself. I’m not referring to the problem of researchers having a better vocabulary than practitioners. In many respects, a vocabulary that practitioners develop is sometimes a more full vocabulary and flexible vocabulary. Researchers (because of their analytical compulsion) must be more precise in their language. They invariably reduce their vocabulary to fewer words, but more tightly defined words. As an example: The word reinforcement has a precise meaning in the literature of psychology. It means nothing like what the teacher means when he or she says *reinforcement*. The teacher invariably means *repetition*—“I’m repeating this.” In the psychologist’s lab the reinforcement means a system of rewards applied to certain kinds of achievements.

Quite commonly when we present the work of LSI, we apply the concept of “research translation” which has to be understood as a different function than simply translating documents from one language into another.

The function of research translation in education is, again, this engineering function of bridging researchers and practitioners, assisting understanding, working alongside practitioners in applied projects, and working alongside researchers to assist interpretation of data in relation to problems in the field of education.

We train teachers largely in an intuitive model which says that, “if what you’ve been taught to do doesn’t succeed, give it up and try something that will.” Obviously, this is a largely ineffective approach (and I’m glad we don’t use it in medicine). One of the tasks of the LSI is to do something about the teacher education program at Michigan State University with reference to this very problem and it has consumed more of our time than any one of our other activities. We have engaged in several projects that have given some sense of direction. For example:

- (1) We have engaged in a project known as the “School of Tomorrow” to discern what is happening in education; to see what kind of resources are available, and what kinds

of developments are making sense in the schools. We want to get some sense of direction so that we can invest time and effort in directions that are apt to pay off. The project has revealed a number of interesting innovations that schools are developing, innovations that should have a significant payoff. We are finding that some of the 'sacred cows' in education's pasture are looking a little sick, which is a fortunate development. The view of the classroom as the private sanctuary of a teacher is being challenged. More teachers (even self-contained elementary teachers) are recognizing that they can't be the law unto themselves.

- (2) Inquiry into what it means to be a *professional* teacher is moving the professional stance in education away from symbolic professionalism to one of research into teaching and learning and problem solving in real situations

The Schools of Tomorrow project has opened our eyes to problems *and* possibilities. It has also opened our eyes to some of the things that are made possible by new media, by innovation in the technological realm. One of the big problems here is that it is difficult to discuss technological innovation without having people get excited either for or against it.

Unfortunately, in American education, we seem to lack systematic processes, evaluative procedures, and ways to put ideas and innovations on trial in limited-scale experiences to examine their impact. As a matter of fact, there are important technological advances today that should be regarded as signs of the future, indicators, or trends.

One of the problems for us in education is that we don't have enough good behavioral research on the sorts of learning tasks that we want students to perform. One of the reasons why the aviation industry (and now the space industry) is so far ahead is because there has been, since about 1914, outstanding behavioral research in the aircraft industry. The industry has employed psychologists since its earliest days, has done careful behavioral research describing the nature of the professional or the mechanical task, as the case may be, and then defining it and re-defining it. At LSI we are making behavioral model descriptions of good teaching as it exists in several different settings. From these studies, we can then determine the sorts of behavior that make a difference and create simulations for teacher development.



Another area of development is in computer applications. Clearly, the computer has created problems for our society. But in a larger sense, it will be a significant solver of problems in this complicated and fast-paced society. Probably the only thing that doesn't have a computer involved in it is the school; one of the last elements in our complicated society to become computerized. Just a few of the areas where the computer can improve school systems and practices include the following.

Information Retrieval.

The computer will bring significant improvement to school libraries as they morph into sophisticated search and retrieval centers. In our lifetime there will be significant changes in library technique. At Michigan State University, we have one of the four high-speed programs for information retrieval in the educational arena. Using this technology an undergraduate student created a device that allows us to solve a problem for the blind. The instrument will be, when completed in prototype, a set of 50 Braille character cells. A line of 50 Braille characters is actuated electronically in order to raise Braille dots on a Mylar surface. It could be possible for a blind person

to telephone the library and, instead of being sent a massive volume, will be able to read directly from tapes into this little machine—all over telephone wires.

School Scheduling.

The computer is increasingly used in scheduling, replacing the old-fashioned technique of two assistant principals sitting down together with a great big coffee pot, Aspirin, yellow slips, pink slips, maroon slips, and purple slips on the wall.

Computer-aided Instruction.

Formerly known as computer-based instruction, it is the use of the computer to simulate a tutorial experience for a student: the use of the computer to generate the problem in a given subject field, whatever it is, so that the type of response the student is making is the modifier of the program itself. But what the computer allows is the possibility of generating problems differently for each student. At Michigan State University we used the Air Force computer at Santa Monica—one of the two largest in the world. We used that computer to teach students at the University of California, Los Angeles (UCLA) intermediate statistics. The computer generated a series of problems that were completely interchangeable, and the response was used to control the next thing for individual students. We found that it took less time for students to complete the statistics experience—about one-third the time it took the control group in the regular classroom with tutorial experience available from the instructor.

Innovation tends not to go astray just because it's expensive today. It will begin to find its way into more areas and become more affordable.