

Prospects for Instructional Systems Design in the Public Schools

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Instructional designers routinely complain about school people's lack of interest in their craft. And many designers are convinced that most problems in schools would evaporate if instructional systems design (ISD) was used to determine teaching methods and what is taught. But exactly what would schools have to do to satisfy designers? How likely is it that schools will respond to the call for ISD and if they do, will it be the panacea that is claimed? These are the questions that I will explore here.

It is highly unlikely that the schools will ever use ISD as it is defined by designers, but that it is perfectly reasonable to expect some schools to use some components of ISD under some circumstances. Piecemeal use of ISD is probably appropriate in view of the way that schools are organized and what the public expects of them.

The paper has four sections. The first describes what designers mean when they say that schools should use ISD. The second contrasts what schools are doing now with what designers say they should be doing. Part three describes the way that schools presently make decisions and the likelihood that the changes favored by designers can and will be implemented. In the final section is a summary of what can and cannot be done in terms of implementing ISD in the schools with implications for designers and the schools.

What Do Instructional Designers Want?

What do designers want when they say that the schools should use ISD? Since more than sixty systems models have been proposed (Andrews and Goodson, 1980), it is probably correct to say that many of the critics would remain unsatisfied no matter what the

schools were to do. But, if we ignore the details of the intricate procedures involved in the models, there is a good deal of common ground among them, and, therefore, some hope for setting a target that most designers would at least applaud if not approve. This is especially true if the target is subdivided into two levels, minimum expectations, and expectations that go beyond the minimum.

Minimum Expectations—Effective Instruction

The basic tenet of every systems model is that it is necessary to spell out in advance precisely what targeted students are expected to be able to do after they have been instructed. Although the procedures for doing it vary widely, all models also require that learning activities that teach students to perform as specified be identified, empirically documented to work, and then used correctly and consistently. Normally the aim is to use activities that not only work but that can also be completed quickly and cost effectively. Some of the models apply to situations like large school systems in which the same instruction is often repeated many times. They propose that the documented learning activities be incorporated into instructional materials which are further empirically verified by field testing and revision, if necessary, then disseminated and used repeatedly and with fidelity.

To meet these fundamental requirements for ISD school people would have to spell out behavioral objectives that explicitly describe what each student should be able to do as a result of the instruction in each lesson, course, grade or other unit of instruction. They would also have to empirically verify that their instructional procedures really do teach students to perform as specified and do so efficiently. Finally, those in the schools would have to see to it that the verified instructional procedures were used

properly by teachers, and document that the targeted students really learn to perform as specified. Getting the instructional procedures used properly would probably require developing and verifying appropriate instructional materials and equipping and training teachers in their use.

Beyond the Minimum—Justifying Content

Many ISD models view instruction more broadly as a means to an end. These models require that the targeted learners must be able to perform useful functions after instruction and that instructional programs be designed, implemented, and evaluated in terms of how well their graduates actually perform in the real world. These broader models suggest that instructional designers begin with a needs assessment to determine gaps between the way things are and the way that they should be. They specify that the objectives for any instructional program be justified in terms of whether learners who have met them close the targeted gaps. Finally, after the instructional program has been developed and is working as it should in terms of teaching the pre-specified skills, these models propose that the program should be further documented in terms of whether the learners actually can and do close the gaps that were targeted. (For an example of such a model, see Kaufman, 1983.)

School people would have to do more to meet this broader concept of ISD. First, they would have to identify and be very explicit about their needs, their goals, and how students graduating from a curriculum or course would be expected to use their skills and knowledge (i.e., 90% of those completing a high school physics course would enter and pass the introductory college physics course for physics majors, 100% of elementary school graduates would be able to read and understand the articles on health in *Time*

magazine). Specified goals would have to be valid in terms of the types of students involved and realistic in terms of the capacities of the schools involved (i.e., rigorous college prep physics instruction would be inappropriate for noncollege bound students and schools with no physics laboratory).

Once the goals were agreed upon, they would have to be analyzed to determine the specific skills that graduates would need to acquire in order to attain them. In turn, the skills required would determine the behavioral objectives toward which the instruction would be directed and the instructional procedures that would be used. After development of the procedures, it would have to be shown that the learners in the instructional program actually achieve the specified objectives. Finally, the program would have to be further evaluated in terms of a followup study of graduates to determine if the goals were met (i.e., find out if they actually do pass physics and are really able to read *Time Magazine*). If the specified goals are not met initially, the program would be revised, as needed, until they are.

What are the Schools Doing?

What are schools actually doing? How large is the gap between the way things are in schools and the way they would have to be to satisfy ISD requirements?

Elementary School Goals

There is quite good agreement among school people across the country that the primary goal of elementary schools is to teach learners to read, write and do certain kinds of arithmetic computations. And, although this goal is not often spelled out in terms of why these basic skills are needed, it does tend to unify the instructional program. Virtually every elementary teacher in the country focuses on getting students to master these three basic skills.

Beyond teaching the three basic skills, elementary school goals tend to be both fuzzy and inconsistent from school system to school system. Most elementary school teachers teach other

subjects like health, art, music and science. But, this instruction is usually low priority when compared with teaching the basic skills, and often done with no specific purposes in mind. From school to school there tends to be little agreement about what else elementary students must learn and this leads to tremendous variation in what they are taught (Bartholomew, 1980).

Goals in the Secondary School

At the middle and high school level there tends to be general agreement that certain "core subjects" should be taught at each grade level (i.e., the vast majority of schools teach biology in the tenth grade, chemistry in the eleventh grade, and physics in the twelfth grade). But little real thought is normally given to how the students are expected to use what they learn in those courses. Consequently, instruction in the core subjects is not goal directed in the ISD sense. Instead, it is assumed that the importance of subjects like science, mathematics, english and social studies is self evident and so most teachers concentrate on "covering the subject". For college bound students this goal, by default, of teaching students the elements of key aca-

tional education) or other topics that someone deems important (i.e., sex education, environmental education, Americanism versus communism). Courses such as these are obviously directed toward nonacademic goals but often these are not spelled out or are defined in very vague terms.

Instructional Objectives

Today Instructional objectives are being widely used by school people. Objectives are an integral part of all of the state-wide student and teacher competency testing programs that have been instituted. It is standard practice in many states and school districts to include objectives in syllabi, and curriculum guides that are developed locally. Even textbook publishers have responded to requests from states and school districts and have added objectives to their products.

But, the recent popularity of objectives does not mean that real ISD in the schools is just around the corner. Many of the objectives found in textbooks, syllabi, and curriculum guides do not spell out what the student is expected to do after instruction. Instead they describe content that students should "know" or "understand" and so represent little more than a content outline in

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demic disciplines, is probably defensible because colleges tend to emphasize the same thing. But, for non college bound students, the fit is difficult to defend (Beame, 1975).

In addition to the core subjects, middle and high schools offer a vast array of elective courses. Some of these simply extend the coverage of the disciplines by treating advanced topics (i.e., advanced chemistry) or disciplines that fall outside the traditional core (i.e., geology). But, some others are qualitatively different. Often, these other courses aim to teach either practical skills (i.e., home economics, voca-

slightly different form. This is especially so in the case of materials for most secondary school subjects where verbal instruction often predominates and the goal tends to be to "cover" academic disciplines. It is less true for secondary school subjects that have more of a skills base (i.e., vocational education, physical science, mathematics) and for basic skills like reading and arithmetic at the elementary school level.

Often, school instructional objectives have other shortcomings when viewed from an ISD perspective. Many objectives are stated so broadly as to be

unmeasurable and probably unteachable (i.e., teach students to be critical thinkers). On the other hand, some objectives are so narrow as to be trivial (i.e., teach students to determine the density of rock salt). And, often the relationships among supposedly re-

Learning Activities and Instructional Materials

For most secondary school teachers "instructional materials" means a textbook that spells out content to be learned by students. They also may have a teachers guide to the textbook

ries with one book per grade level. And, the textbooks in a series are usually accompanied by master topic scope and sequence charts, and by comprehensive teacher guides, that give detailed suggestions to teachers as to what to do at each grade level. Although few teachers are required to follow these suggestions, many tend to do so.

Most school textbooks are outlined and drafted by author teams, consisting of subject matter experts and experienced teachers who are brought together by a commercial publisher. The content of the book is usually based on subjective judgments made by the members of the team. They also may consider the criteria that large states and school districts use in selecting textbooks. The publisher edits the authors drafts, for clarity and marketability. Next the publisher designs and manufactures the final product and then markets it to schools. Editorial control is normally retained by the publisher, but the authors of a few large federally funded projects have retained editorial control over their products that were published by commercial publishers. Formative evaluation of commercial textbooks is usually limited to collecting subjective judgments from potential users.

It is quite rare for individual teachers to select their own textbooks. In fact, one study found that over half of the public school teachers surveyed played no role at all in choosing textbooks that they were required to use (Solomon, 1978).

In slightly less than half of the states, textbooks are selected on a state-wide basis. The usual process is for a committee composed of lay citizens, and educators to pick books to be recommended to a commissioner or Board of Education that makes the final selection. In some cases, local school districts have a choice among several adopted books, and sometimes they may choose books that have not been adopted (this usually entails a financial penalty). In other states, textbooks are usually selected by the local school boards upon recommendation of a committee of local citizens and/or teachers (Warming, 1982).

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lated objectives are unclear. These kinds of technical problems probably stem from the fact that syllabi and curriculum guides are normally developed by teachers with little or no training in ISD and who must often work under severe time constraints.

Several fairly recent innovations, aimed at individualizing instruction in schools, have included real behavioral objectives as an integral component. "Learning for Mastery" is an example of such an innovation at the elementary school level. The focus of this approach is to set stringent standards of student performance based on predetermined objectives (Block, 1971). Many large school systems have made extensive use of the mastery model including New Orleans (Geisert, 1979) and Philadelphia (Kopple & Conner, 1980). Individually Guided Education (IGE) is another example of such a program at the elementary level (Klaus-meier, 1976), as is Individually Prescribed Instruction (IPI) at the secondary level (Glaser and Rosner, 1975). Often the objectives that were generated for these individualized programs were fairly close in form and quality to what instructional models specify. However, the programs are not widely adopted across the country and there have been many complaints about the extra work required of teachers, dullness of the instruction, lack of attention to teaching attitudes, and other matters (Holton, 1982).

that suggests points to be emphasized and perhaps ways to teach the various topics. And they may have been given a syllabus for their course that had been prepared by their local school system. It is the teachers' task to go from there and decide what and how to teach to five classes of 30 students per day.

Studies suggest that most secondary teachers are highly influenced by their textbook (Solomon, 1978). In most classes learning activities focus on reading the textbook and conducting lectures and class discussions on topics that are included in the textbook. Teachers of a few more skill oriented subjects like art, shop, home economics, and science often include hands-on learning activities. Audio-visual products are occasionally used by a few teachers and computer based instruction is finding its way into a few classrooms. But it is clear that textbooks are the source of most of the instruction (Solomon, 1978).

Elementary teachers also tend to make heavy use of textbooks but many of them elect to supplement texts with other materials. Elementary teachers lecture infrequently, but often conduct discussions with their students. And elementary students often engage in hands-on activities and drill and practice on skills. Many elementary textbooks contain directions for student activities as well as descriptive material. Typically, the textbooks for a particular subject are organized into a se-

Criteria for selecting textbooks varies among states and districts but often include appropriateness of content, durability, readability, and graphic design. It is rare for adoption committees to require data relating to effectiveness but a few states are experimenting with a requirement that publishers use "learner verification" (this requires some form of testing with students). Special interest groups and citizens frequently try to influence the selection process in an effort to purge certain topics from the curriculum or to get certain topics included (Jenkinson, 1979).

Summing Up

Clearly school practice does not often meet the minimum requirements for ISD that were spelled out earlier. Objectives for instruction are frequently unstated, are not behavioral, or are written in ways that make measurement difficult. Learning activities and instructional materials (textbooks) are usually designed and selected on the basis of intuitive judgment rather than to further the achievement of pre-stated behavioral objectives. And, it is rare for schools or publishers to use field testing and revision cycles to verify the effectiveness or efficiency of learning activities or instructional materials in meeting objectives.

Goals for school instructional programs often remain unstated or are stated in terms of things that students should learn rather than in terms of the purposes of learning. Schools rarely conduct follow-up studies of their graduates' performance in the real world as a basis for determining if instructional programs are achieving their goals.

The Public School Setting

In assessing the prospects for ISD in the schools, it is critical to realize that there is not a national school system in the United States. The main way the federal government impacts the schools is by enforcing provisions of the U.S. Constitution (i.e., prayer in schools, desegregation) and by providing limited funding for targeted programs (i.e., vocational schools, special education). Although these kinds of

actions have been fairly intrusive in recent years (Boyd, 1978) it is probably reasonable to say that the federal government still delegates to each of the fifty States most of the responsibility for generating and allocating resources for its schools and most of the power to decide what will be taught in them (Moser, 1977). This delegation of authority means that it would take at least fifty independent decisions to make nation-wide changes in the way schools operate.

The State Level

Until fairly recently, the states have tended to further delegate most of the authority for curriculum and instructional practice to the individual school

ample of this kind of expansion. In many states, these adjustments have been profound but their impact on instructional procedures has been minor. In those states, the local districts retain the balance of power. But, a few states have adopted comprehensive school improvement programs that integrate into a single unified strategy a combination of fiscal, organizational, staff development, curriculum enhancement, and student assessment elements (Odden and Dougherty, 1982). In these states, the balance of policy making power regarding instruction, has shifted substantially to the state.

In assessing the role of the states in determining policy and practice in areas of interest to instructional de-

The decentralization of decision-making present in the United States, means that it would take at least fifty independent decisions to make nation-wide changes in the ways schools operate.

districts within their boundaries. Also, local school districts have been responsible for generating most of their own resources for schools, mostly through local property taxes. This has meant that each of the roughly 16,000 school districts in the country was more or less free to decide for itself how much money would be spent on schools and for what. The districts also had most of the power to decide what would be taught and how.

The individual states have traditionally retained authority in a few areas that relate to ISD. In every state, teachers must be certificated by the state before being hired by a local district (Woellner, 1979). In about half of the states, textbooks are selected on a state-wide basis rather than locally (Bowler, 1978).

In recent years, most states have taken on more responsibility for funding schools and have expanded their authority over curriculum. Introduction of state-wide teacher and student minimum competency testing programs is the most widespread ex-

signers, it is important to remember that the States are made up of the school districts and that decisions by states are usually made by committees and legislative bodies whose members represent the districts. Consequently, state level decisions often tend to reflect the consensus of what districts want, and they are often riddled with loopholes that accommodate the dissenting opinions of strong districts. Furthermore, most state decisions related to instruction, tend to spell out general policy and not classroom practice. With this in mind, it is probably safe to say that the states are very important, but the real action, in terms of determining the instructional program of schools, remains in the approximately 16,000 individual school districts around the country.

The Local School District

If U.S. public schools, taken as a group, are not presently good examples of applied ISD and if the 16,000 local school districts are the primary determiners of instructional practice,

then, it follows that putting ISD into "the schools" would require that someone in the individual districts make the relevant policy decisions and that these be followed up with appropriate adjustments in local practice. But, who in local districts decides what will be taught and how the teaching will be done? And, who has the authority and capacity to really change what happens? Put another way, who is it that designers must influence if they really want to get ISD installed? And, what is the likelihood of getting a favorable decision followed by vigorous affirmative action? Let's look at these matters.

Figure 1 diagrams a typical structure for determining instructional policy and practice in a middle sized U. S. school district. The general structure is fundamentally the same for larger districts but with increased staff at the assistant superintendent and supervisory levels. In smaller systems, the assistant superintendent and supervisory levels are either eliminated or there are fewer people with more general responsibilities.

Three aspects of Figure 1 are of special interest to designers interested in getting ISD into the schools. First, overall policy for the instructional program is set by a board of lay citizens who are elected by the citizens of the school district and who are subject to pressures from many directions. This means that much decision making in public schools is, fundamentally, a political matter that may or may not be rational.

The second striking feature of Figure 1 is the strategic role played by teachers. The teachers are the key members of the curriculum committee who often determine the syllabus and the instructional materials that will be used in the district (the school board approval usually required is often "rubber stamp"). More importantly, the teacher, after receiving the syllabus and materials, decides what is actually done in the classroom. While it is true that the persons listed on the upper part of Figure 1 often set the instructional policy for a district, instructional practice is mostly determined by the teacher after he or she closes the classroom door.

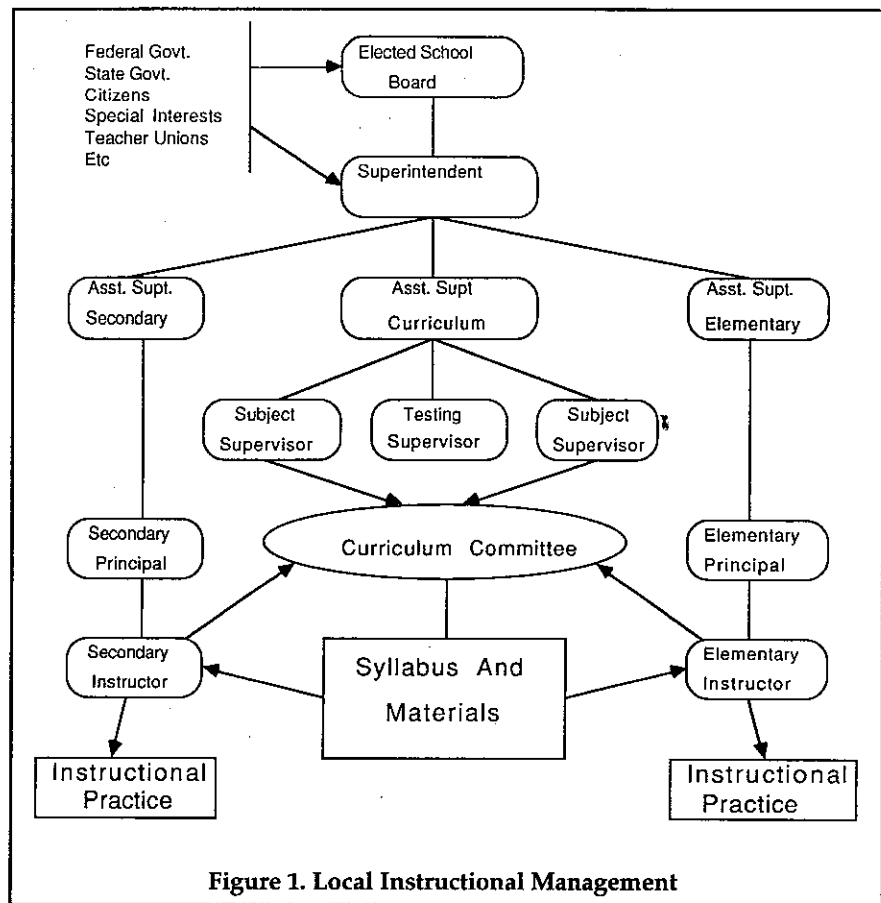


Figure 1. Local Instructional Management

The final important feature of Figure 1 is the lack of influence by outside experts. With minor exceptions, local policy and practice are determined by local people. And, it should be noted by designers, that few people in local school districts have any formal training in ISD.

Clearly, the task of getting ISD into widespread use in the schools is complex and difficult. To get the necessary policy changes made, designers would have to convince many state departments of education and local school boards that the ISD cause is right. And, to influence practice, it would be necessary to convince large numbers of individual teachers of the advantages of ISD and to influence them to make appropriate changes. Changing the schools would also require that other relevant agencies, like textbook publishers and teacher training institutions, adjust their procedures. Since designers presently have very little credibility in school circles, this is a tall order indeed!

Implications

Given the diversity in schools around the country and the decentralized decisionmaking, designers are not likely to be successful in any effort to implement ISD in schools from coast to coast. But, this should come as no surprise. The difficulty of innovating in schools is well known and very well documented (Berman & McLaughlin, 1974, 1977, 1978).

It could be argued that one way to progress with ISD would be to press for massive changes in the way schools are governed, operated, and organized. Appealing as this approach may seem, it is not likely to bear fruit. The major thorn in the side of innovators is the diversity created by state and local control of education. That control is rooted in the United States Constitution and is entrenched by the strongest kind of political support.

A more realistic way to proceed would be to try and reduce the complexity of the existing system. One way of doing this is to focus at the local

school system level, rather than at the national or state-wide levels. Another, is to concentrate on a single school subject (i.e., mathematics), rather than the full range of the curriculum. A

moment. The truth is that instructional designers do not really know how to teach mathematics to low ability, mathematics-shy youngsters. And, we do not know how to teach a lot of other

The most likely means of getting ISD utilized in the classroom might include focusing at the local school system level, concentrating on a single subject, or focusing on school systems that are favorably disposed to ISD.

third, is to focus initially on school systems that are favorably disposed to ISD and on subjects that are skill oriented and, therefore, relatively easy for designers to attack (i.e., vocational education). Tactics like these are unlikely to change the world but they do increase the chances for small victories (Benathy, 1969).

Simply reducing the complexity of the target will help but it will not put ISD into the schools. It is also critical that ISD projects be carried out with implementation in mind. Constraints within the receiving schools must be identified and either eliminated or accounted for. ISD products must be perceived favorably by those who must use them. It is critical that the right kind of support be given to teachers and others who must actually change what they are doing. Morgan (1987), and Burkman (1987), have recently published comprehensive models for planning and executing ISD projects to maximize the chances for successful implementation.

A Last Word

In assessing the prospects for ISD in the schools, it is important to remember that there are some limiting factors that simply can't be overcome at the

things as well. Until and unless some breakthroughs are made in instructional procedures, the possibilities for improving schools, through ISD, are very definitely limited, even if the schools were to become highly receptive.

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