

Educational Systems Design (ESD): An Integrated, Disciplined Inquiry in Schools of Education

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Following the release of *A Nation at Risk* in 1983, many localities across the United States began the process of making fundamental changes in their educational systems. The interrelated and interdependent nature of separate components of educational systems require systemic change to bring about fundamental change. Many educational leaders are advocating systemic change in education, including John Goodlad (1984), Lewis Perelman (1987), and Bela Banathy (1991, 1992).

According to Banathy (1992), the systems design approach is key to successful systemic change in education. It is helpful, if not necessary, to be familiar with the systems design approach in order to be successful at systemic restructuring. Therefore, we need training in systems design. Unfortunately, neither schools of education nor educational professional development programs offer curricula in systems design (Banathy, 1991). This article gives an overview of the purpose and function of Educational Systems Design (ESD) as an integrated, disciplined inquiry in the nation's schools of education.

The Need for Systemic Change

Duttweiler (1989) stated that most of the educational reform efforts of the last few decades have espoused the idea that effective change in

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education involves refining the existing system. It appears that most of these reform efforts have not significantly improved education. Hurn (1985) stated that "there is a great deal of controversy about how much the school reform movement succeeded in changing schools during the late 1960s and early 1970s" (p. 258). In describing the unsatisfactory results of the most recent school reform movement, Banathy (1991) reported, "In the course of the last several years, the states have spent up to 70% more on education, supporting piecemeal improvements that have resulted at best in minuscule gains" (p. 8).

Since *A Nation at Risk* was released in 1983, many reports have called for fundamental change rather than the traditional, piecemeal, "tinkering at the edges" approach to educational improvement (Perelman, 1987). If we are to bring about fundamental change in education, we must recognize the interdependent and interrelated nature of the separate components of our educational systems and the way they interface with society. Goodlad (1984) stated:

Significant educational improvement of schooling, not mere tinkering, requires that we focus on entire schools, not just teachers or principals or curricula or organization or school-community relations but all of these and more. We might begin with one or several of these but it is essential to realize that all are interconnected and that changing any one element ultimately affects the others. (p. xvi preface)

Thus, fundamental change in education requires systemic change: a change in one part of the system requires changes in other parts (Banathy, 1991). Systemic restructuring therefore is needed to bring about fundamental change in our educational systems.

Systemic restructuring has only occurred once in the history of US education: when we changed from the one-room school house (the agrarian model) to our present system (the industrial model). Now our society is undergoing massive changes as we evolve into the information age. This is why systemic restructuring is again needed in education.

The Need for Educational Systems Design (ESD) as a Disciplined Inquiry

If massive changes in society are creating the need for systemic change in education, then we have to study and analyze those changes and examine the implications they have for education (Banathy, 1991). We need a discipline in education which is concerned with identifying the features that the new paradigm of education should have to

meet the needs of learners and society in this information age, and which will identify the change processes that will best facilitate the transition to the new paradigm of education. This is why Banathy (1991) suggests using the systems design approach for systemic restructuring. In describing the systems design approach, Banathy (1991) notes:

It views the educational problem situation as a system of interconnected, interdependent, and interacting problems, seeking to create the design solution as a system of interconnected, interdependent, interacting, AND internally consistent solution ideas. The systems design approach seeks to envision educational arrangements and the entities that attend to those arrangements as a WHOLE SYSTEM that emerges and should be designed in view of the synthesis of its interacting parts. (p. 12)

ESD as a discipline will benefit greatly from the presence of ESD programs in the nation's schools of education. Unfortunately, our nation's schools of education do not have curricula in the systems design approach. As Banathy (1991) explains:

Judging from the current literature and the various studies and reports on educational reform, the educational community is not familiar with and is not practicing systems design; "there are no roads marked out" yet for a design journey in the field of education. Neither schools of education nor educational professional development programs offer curricula in systems design. The material presented in this book aims to make a contribution to educational reform by introducing systems design as a disciplined inquiry and by marking the road thereof. (p. 154)

Furthermore, in 1991, we conducted a survey of principals of 60 restructuring schools nationwide. With 50% of the schools responding, the results show that 89% see a great need for a program on ESD in the nation's schools of education. Also, 55% totally agree, 24% mostly agree, and 21% partially agree with the statement, "There should be one required course in systemic restructuring of education for all education majors" (see Table 1).

An Interdisciplinary Program on ESD

Systems design, by its very holistic nature, requires that we have knowledge of parts such as management, finance, governance, learning and instruction, and so on. Students who are being prepared in this area need to learn about the parts as well as the whole. Therefore, the discipline of ESD should manifest as an interdisciplinary program. The Indiana University School of Education is in the process of creating a new graduate minor

in ESD. The following courses are planned as parts of this minor.

Educational Systems Design

Educational Systems Design. Takes a holistic, systemic view of changes in society, the kinds of changes they require in our educational system, and the kinds of change processes most likely to facilitate the design and implementation of those changes.

Organizational Change Theory

Staff Development Issues and Principles. Identifies, discusses, and evaluates models of staff development being used in schools, such as individual change models, organizational development models, and cultural change models.

Educational System Change Models and Strategies. Discusses structural and role changes required to support educational improvement efforts through instructional development and staff development. Social and behavioral theory and research are used to develop practical system-change strategies.

Seminar in Policy and Administration. Examines the current research and theory on public organizations, including factors affecting organizational structure, behaviors of individuals in organizations, policy and administrative processes, and change within organizations.

Policy Change Issues

Seminar in Educational Policy. Addresses how educational policy is designed and enacted, and possible outcomes of educational policy-making.

Relationship Between Education and Society

Education and Social Issues. Addresses the impact of our pluralistic society on education, and its potential problems in reaching educational goals.

Sociology of Education. Examines the role of schools in society, and the interaction between schooling as a social institution and other institutions of society.

Education and Change in Societies. Studies the influences which educational systems and societies have on one another. In order to help a school or educational system develop or change, it is important to understand the society surrounding it.

Preparing Specialists in ESD

In describing the complexity involved in redesigning education, Banathy (1991) writes,

Some reformers are now calling for a radical redesign

Table 1

Results of ESD Survey

1. Are you still involved in restructuring?				6. How would you like to have one of your people come to an intensive summer program like ESD for training and go back to train others in your school.			
Yes	No			Very interested	Moderately interested	Mildly interested	Don't have interest at this time
96.67%(29)	13.33%(1)			50.00%(15)	16.67%(5)	23.33%(7)	10.00%(3)
2. Have you received any training in systemic restructuring?				7. How interested would your people be in attending each of the following kinds of workshops.			
Formal Training	Apprenticeship Training	Workshops	None	Very interested	Moderately interested	Mildly interested	Don't have interest at this time
10.34%(3)	0%(0)	44.83%(13)	44.83%(13)	<i>Inside your community For credit</i>			
3. Have you attended any workshops in systemic restructuring?				46.43%(13)	21.43%(6)	17.86%(5)	14.28%(4)
More than two	Two	One	None	<i>Inside your community No credit</i>			
44.00%(11)	12.00%(3)	4.00%(1)	40.00%(10)	24.00%(6)	20.00%(5)	32.00%(8)	24.00%(6)
4. There is no program in Educational Systems Design in our nation's schools of education. Do you see a need for such a program?				<i>Outside of your community For credit</i>			
Great need	Moderate need	Mild need	No need	7.14%(2)	28.57%(8)	50.00%(14)	14.29%(4)
88.89%(24)	7.41%(2)	3.70%(1)	0%(0)	<i>Outside of your community No credit</i>			
5. "There should be one required course in systemic restructuring of education for all education majors." Do you agree with the above statement?				8.00%(2)	20.00%(5)	40.00%(10)	32.00%(8)
Totally agree	Mostly agree	Partially agree	Totally disagree				
55.17%(16)	24.14%(7)	20.69%(6)	0%(0)				

Note. Number(s) within parentheses indicate number(s) of respondents.

and transformation of education. It seems, however, that most of those who call for redesign do not know how to go about it. (p. 5)

ESD is a complex change process which requires the integrated efforts of all involved in the process. Therefore, an ESD program should provide adequate training to its students so that they can work as consultants or specialists to assist, train, and educate teachers and stakeholders of schools in designing new educational systems. Along with providing training to its students, an ESD program can also offer programs to teachers, administrators, and stakeholders on campus and off campus (at restructuring school sites) according to the needs of the participants.

Mojkowski and Bamberger (1991) note that the

most appropriate settings for developing leaders are within schools that are restructuring or planning to restructure. Our nationwide survey of principals of 60 restructuring schools shows that 46% of respondents are very, 21% moderately, and 18% mildly interested in attending workshops for credit inside their community (see Table 1). The Instructional Systems Technology Department of Indiana University recently created an outreach program known as the Restructuring Support Service (RSS) to provide support to restructuring schools in Indiana. The RSS provides facilitation, on-campus and off-campus workshops, and teleconferences to restructuring schools. To explore the need for and interest in an on-campus intensive summer program in ESD, we asked the principals

of restructuring schools, "How would you like to have one of your people come to an intensive summer program like ESD for training and go back to train others in your school?" Fifty percent of the respondents were very interested, 17% moderately interested, and 23% mildly interested (see Table 1).

The Qualifications of Academic Advisors in ESD Programs

Students interested in ESD need academic advisors who can help them to form an integrated interdisciplinary program in ESD according to their specific interests. However, we need to recognize that many professors who might offer courses in an ESD program might not have qualifications in systemic restructuring. Therefore, academic advisors need to have some professional development in ESD. At present, we know of no summer institutes where professors can go and get the skills they need in ESD.

It is hard to define exactly what skills are needed. One approach would be for all professors interested in ESD to get together and collectively define what competencies they feel everybody should have in ESD. Since those professors may come from different departments, they will have different perspectives about what is important in systemic change. For example, a professor from school administration is likely to have an administration slant and a professor from instructional technology is likely to have a technology slant on what systemic change should be like. With multiple perspectives on systemic change, they can form a common core of knowledge that is likely to be better than if any one department did it alone, and they can make a collaborative decision that each of them must update their own skills in whatever they are missing. Perhaps whoever is the expert in each area could assign some readings and conduct a discussion group. Together they could figure out not only what should be learned, but a means for learning it as well.

Recently, educational restructuring has been an important topic for many important national and international conferences, including the 1992 annual meeting of the American Educational Research Association held in San Francisco and the 1992 annual meeting of the International Society for the Systems Sciences held in Denver. The professors interested in ESD could attend such conferences to further enrich their knowledge in ESD.

Prospects for the Graduates of ESD Programs

Students specializing in systemic restructuring of education could work as consultants to public

schools that are interested in restructuring. The role of an outside consultant is to train the design teams of restructuring schools and to facilitate their design processes. They could also work in colleges, universities, and professional educational research and development programs to train future ESD professionals and to conduct research on ESD. And they could work as systemic restructuring coordinators or researchers for school districts, state departments of education, or the federal Department of Education.

Conclusion

More and more schools nationwide are restructuring, and many others are planning to restructure. Increasing numbers of these restructuring schools are coming to recognize that they need assistance in their change processes. The discipline of ESD can provide such assistance to those schools. This discipline will improve our knowledge base for systemic restructuring of education and thereby benefit school restructuring efforts. We encourage our nation's schools of education to form ESD programs that will provide guidance and training to those who are interested in school restructuring. □

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Technology News

Apple Announces Licensing Strategies and Alliances for Newton Technology. Apple Computer has made a number of announcements underlining its commitment to make its "Newton" technology "a pervasive standard available to the computer, consumer and telecommunications industries." Apple aims to license key technologies to companies that can manufacture and market a variety of new products—based on Newton technology—to a broad range of customers. Newton is a family of personal digital assistant (PDA) products and technologies from Apple Computer due to be launched later this year. Newton technologies have been designed in such a way that key elements and components can be licensed to third parties. Several companies have announced their commitment and support for Newton technologies:

- Sharp Corporation, Apple's ally in the development and manufacture of Newton, is to be a licensee of the ARM chip which will be at the heart of the Newton family. Sharp joins two other ARM licensees, VLSI and GEC-Plessey.

- Motorola has announced an agreement with Apple to license Apple's Newton technology in order to manufacture and market a handheld device featuring integrated, wireless communications capabilities based on the Newton operating system.

- Apple and Siemens announced plans to collaborate on the development of "NotePhone," a combination of Siemens-ROLM telephone and Newton technology which will provide access to telephone and fax features.

- Cirrus Logic has announced their support of Newton technology by developing and supplying Newton-compatible chipsets for use by licensees of the Newton operating system and by Apple itself in its planned Newton products.

- Kyushu Matsushita Electric (KME) announced an agreement to license the Newton operating system for use in future products. Apple and KME also intend to explore the opportunity to include KME-provided technology in future Newton family products.

- LSI Logic is manufacturing an Application-Specific Integrated Circuit (ASIC) chip for Newton PDA's. The ASIC provides the interface between the microprocessor, the memory and the user interface. The device is cell-based, full custom and uses 1-micron process technology.

Distance Learning Moves into the Workplace. Ameritech, one of the regional Bell Telephone companies, has announced its first interactive training project connecting businesses to schools. Called SkillLink and believed to be the first application of its kind in the nation, the project will allow workers to take advantage of education and job training opportunities to which they might otherwise not have access.

"There's a critical need in the workplace for employee training and retraining," said Frank Boscarillo, Ameritech's coordinator of the project. "SkillLink is an example of how the public communications network can offer educational and retraining resources to every business in an efficient, cost-effective manner."

In June, several northwest Ohio businesses began using Ameritech fiber-optic lines to link to the Toledo and Findlay, Ohio campuses of Owens Technical College, the state's largest technical school. At their work sites, businesses have set up classrooms to use Ameritech's information superhighway to join other work sites in connecting to the college. Employees can take courses for training purposes and earn college credit, without the need for an on-site instructor.

"The beauty of SkillLink is that students can see and talk to the students in selected classrooms, as well as to the instructor," said Dr. Paul Unger, vice president for academic affairs at Owens Technical College. "Unlike typical interactive training, which is only one-way communication, SkillLink stimulates a live classroom experience, but eliminates the travel time and expense."

Among the companies participating in the project are: Ball Metal Corp., Centrex Corp., Cooper Tire & Rubber Co., Harris Corp./Semiconductor Sector, Libby, Inc., and Whirlpool Corp./Findlay Division. Collectively employing about 7,000 workers in the area, these companies were recruited by the Ohio Manufacturers' Association and represent a broad cross-section of the manufacturing community.