

A Professional Development Program in Educational Systems Design

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Publicity and concern over the state of public education in the U.S. have led to a variety of reform recommendations. The types of reforms called for generally fall into two categories: (a) reforms that refine or modify slightly the current overall model, and (b) reforms that assume that the current model of schooling cannot be fixed or modified but must be replaced with totally new and more efficient ways of instruction and learning. Increasingly, recommendations arising from national and state level commissions on educational reform fall into the second category. For example, the recent New American Schools Development Corporation (NASDC) competition stimulated hundreds of major collaborations among various and diverse educational interests. NASDC called for "break-the-mold" designs and put significant funds into a complete rethinking of the educational system. More and more states, school districts, and individual public and private schools are looking toward systemic restructuring of education.

We refer to the process of systemic restructuring of education as educational systems design. Educational systems design involves much more than redesigning individual schools. Obsolescence and failure of education is rooted not in the design of schools but in the design of school systems. Effective redesign of schooling requires that we look at the behavior of large-scale systems. Education must be viewed as a

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complex system of interacting influences at various levels—the individual student level, the classroom or group level, the school, district, and state levels, and the interactions and influences of the home, the media, the peer group, the neighborhood, the community, the work setting, and the influence of our technology oriented information age. Educational systems design considers all of these activities and influences as integral to the total process of schooling and attempts to plan and coordinate among these various influences to produce results that would not be possible under the separate influences alone.

Educational systems design requires an ensemble of skills that are critical to the process. These skills include knowledge about systems and systems thinking, systems design skills, knowledge of the change process itself, group processing skills, interpersonal skills, facilities planning, budget reform, and other skills. Systemic restructuring is a very difficult process and requires a wide variety of skills, inputs, and knowledge. Skilled professionals are needed who can provide guidance and expertise to systemic restructuring efforts.

This article reports on a preliminary effort to develop a blueprint for a professional development program in educational systems design (ESD). The program is intended to prepare people to be facilitators in major educational change and systemic restructuring efforts. This preliminary blueprint originated from conceptual work done by a small team of theorists and practitioners assembled at the Fourth International Conference on Comprehensive Systems Design of Education, in Asilomar, California in December of 1992. These included the authors, Bela Banathy, and others who attended the Asilomar conference and gave input. The team focused its attention on the skills and competencies necessary for facilitating large-scale educational systems design efforts, rather than on a set of skills that might be necessary for more piecemeal efforts, such as establishing site-based management or developing new courses or learning materials—not because these skills are unimportant, but because they are on a different scale from the kind of systemic change sorely needed in education today. The article also builds on the work that the authors have been doing in this area: Salisbury in Florida on The Florida Schoolyear 2000 Initiative, a large-scale initiative to create an alternative model of schooling for Florida; Reigeluth in the SIRIUS project and more recently the Restructuring Support Service, which is helping Indiana school systems to engage in systemic change; and Soulier in Utah's Educational Technology Initiative, which is a \$90 million dollar investment in technology to bring about major changes in Utah's education system.

Methods

Our task was to identify the kinds of competencies a

person would need to successfully facilitate an educational systems design effort. We began by identifying the settings in which these competencies would be applied. Then we conducted a general-level task analysis of facilitation in such settings. This resulted in the identification of facilitation stages and facilitation considerations. Then we proceeded to develop a content listing for a graduate program for prospective or practicing facilitators. The results of each of these activities are described in the remainder of this article.

Settings for Educational System Design

We decided that education systems design could be conducted in at least three different settings:

- Model Schools and Lab Schools. (This includes individual schools with special additional funding and individual university laboratory schools.)
- Public schools. (This includes regular public schools, state-operated charter schools, magnet schools, and schools within schools.)
- Private schools.

Forming model schools is a very popular approach for educational reform. In our view, there are certain problems with model schools. Model schools are demonstrations, experiments, or pilot projects with a beginning and end point. They are generally reliant on external "supplemental" funding. This reliance on supplementary funding is a problem because it causes the model schools to be viewed as a deviation rather than a viable alternative for *all* schools. The special supplemental funding and other special privileges that model schools receive cause them to be viewed as provisional activities that add to the total costs. Because of this, they are typically defunded at the first hint of fiscal austerity. In our view, if systemic restructuring is to be effective, it must affect internal structure and involve the commitment of core budget resources from normal budgets—if it is to be viewed as a viable alternative for all schools. In terms of potential impact, we see working with regular public schools as having the greatest potential for effecting nationwide change.

Facilitation Stages

The following stages were identified for the process of helping the participants in a systemic restructuring effort:

1. Help participants recognize the problems with the current system and the pain associated with change. This includes at least three substages: (a) help participants recognize the extent and severity of current and anticipated problems with the current system of education; (b) help participants recognize and cope with the pain required for change to occur and to recognize the potential gains; and (c) help participants understand the idea of systemic change (radical changes at all levels of the system), when it is needed,

and the likelihood of a short-term discontinuity as a new system is established.

2. Help participants recognize how changes in society are creating the problems that schools are experiencing, and that individuals and groups should not be blamed.

3. Help participants recognize the need for a paradigm shift and to commit to helping to bring it about.

4. Help participants gain a systems view of education, with an understanding of the inter-relationships among parts of the system and between the system and its environment.

5. Help participants recognize the need for a systems design approach to solving the problems, not a piecemeal approach nor an adoption approach (just adopting changes that someone else has made). The systems design approach entails re-engineering all processes before applying new technology, using a design process to invent a new educational system, and starting with a vision of the ideal, based on common values.

6. Help participants recognize the need for public involvement and ownership of the process and the new design.

7. Help the participants see the value and utility of creating a new, independent, parallel system within the system, to disarm resistance, reduce risk, and lessen the resource requirements for the "retooling" effort.

8. Identify a community-wide mission and common values about education to build a common ground for a community-wide effort. This entails involving a diversity of people and stakeholder groups in the change effort. Banathy's (1991) 4x4x4 framework provides a useful mechanism to help participants see some of the value-options from which they can choose.

9. Identify specific functions that must be present for the identified mission and values to be attained.

10. Identify the mechanisms and specific features of the new system to accomplish each function.

11. Develop and adopt a "final" system blueprint (which will of course continue to be modified and elaborated as it is implemented).

12. Develop a phased plan for implementation based on "irreversible" enabling stages. These are stages that lead naturally to the next stage of design, where once one stage is completed, it becomes obvious that the next stage is needed.

13. Carry out the implementation plan.

14. Engage in continuous evaluation and revision for continual improvement of the system.

The major task facing the ESD facilitator is to help the participants to understand the seriousness and sources of their problems, to understand that systemic change is needed to eliminate those problems, and that a systems design approach is perhaps the only way to bring about systemic change. Those stakeholders

participating in the restructuring effort will likely not all be aware of the seriousness of the problems and "pain" that their educational system currently endures. But an understanding of those problems is important both as a source of motivation to undertake the sacrifices inherent in a massive change effort and to help understand the nature of the changes that are needed. Therefore, it is important for a facilitator to develop strategies to help those participants identify the nature and seriousness of the current problems—and of those problems that can be anticipated if change does not occur. Related to this are strategies to help participants see current and future opportunities that will be missed if change does *not* occur. Then it is helpful to develop an understanding of the costs involved in failing to deal with the current and anticipated problems (including lost opportunities).

Once the problems and their costs have been identified, the facilitator needs strategies for helping the participants to identify the real sources of those problems—the specific societal changes that are causing the problems—and to understand that the source is not any one person or group of individuals. Then strategies are needed for articulating appropriate messages that can help to convince the broader community of the seriousness of problems with their current educational system and the nature of the source of the problem.

Facilitation Considerations

We identified six major considerations that impact upon the work of a facilitator: (1) the various roles that people play in the change process, (2) the values or criteria for the new design and the design process, (3) essential change strategies, (4) emotional stages of participants during the change process, (5) common attitudinal roadblocks that facilitators encounter, and (6) the acceptability of macro versus micro changes. Each of these is discussed next.

1. Roles

Conner (1993) has identified four major roles in the change process: sponsors, advocates, agents, and targets. Sponsors are these who are willing to initiate and sustain the change effort by providing resources and personnel. The initiating sponsor or sponsors may be different from later sponsors, but in both cases they will usually be people who:

- are willing to speak out publicly to support the change effort,
- have a vision about what changes are needed,
- recognize and feel the pain caused by the status quo,
- understand both the personal and organizational resources available for the change effort,
- have an in-depth understanding of the organization,

- understand the scope and impact of the needed changes,
- are willing to speak privately with people to support the change effort,
- are willing to reward the facilitators,
- continuously monitor the activities in the change effort,
- are willing to make sacrifices for the change effort, and
- are willing to provide sustained support over time.

Advocates are people who speak out publicly and privately to further the change effort. Agents are those who do most of the work to bring about the change. And targets are those who are affected by the change. In many cases, any given person may play several of these roles. For example, a highly respected teacher, who is a target, may also be a member of the restructuring team, making her an agent; and she may also speak both privately with other teachers and publicly in community meetings to advocate the changes.

2. Values/Criteria

The efforts of a facilitator will be influenced heavily by the values or criteria that are selected for both the design process and the new design. Values/criteria for the design process include: user-designer approach versus expert designer approach, concurrent versus sequential design, incremental versus immediate implementation, and parallel-system approach versus whole-district approach. Values/criteria for the new design include: learner-centered versus teacher-centered, quality science focus, basing any competitiveness on student ability rather than financial ability, and separate rather than integrated with social service agencies.

3. Essential Change Strategies

The efforts of a facilitator are likely to be more successful to the extent that certain strategies are used. One is to bring resisters into the decision process early and take their comments seriously. Another is to foster a "cascading" from the initiating sponsors to the sustaining sponsors. Third, it is helpful to build a base for sustaining financial support. Fourth, the superintendent's and principal's roles should be active rather than either passive or overbearing. And, fifth, group members should be involved in leading the group and in making as many of the presentations as possible.

4. Emotional Stages

Participants in a systemic change effort will normally go through a series of emotional stages (Conner, 1993):

- (1) uninformed optimism,
- (2) informed pessimism,
- (3) hopeful realism,
- (4) informed optimism, and

(5) completion.

The facilitator should affirm the feelings at each stage and use appropriate tactics for each.

5. Attitudinal Roadblocks

Facilitators are likely to encounter two attitudinal roadblocks in their efforts to foster systemic change. These attitudinal roadblocks are often expressed in the following terms:

- (1) "We tried that and it didn't work!"
- (2) "Good teachers already do that!"

Those who make these statements may need to be shown that systemic restructuring is something different than what they have done before. Generally, previous changes were not part of system redesign and, while it is true that some teachers may already be doing many good things, the new processes may not be pervasive and institutionalized. The facilitator needs appropriate strategies for dealing with each of these attitudes.

6. Macro Versus Micro Changes

People have been found to get more upset with small changes that directly affect them than with large changes that only indirectly affect them. The implication for facilitators is that starting with small changes under the hopes of gradually taking on bigger ones may not be a good strategy. Facilitators need to start with changes that will give the most leverage for the least resistance. Success breeds success. Once pay-off can be demonstrated for changes that raise relatively little resistance, that will help to convince people to go along with changes that affect them more directly.

Content to Teach to Facilitators

After the "task analysis" that identified the facilitation stages and facilitation considerations, we proceeded to identify the content that should comprise a professional development program for facilitators. First, we identified seven competency areas. These seven areas are:

- systems thinking,
- systems design,
- change management,
- group process skills,
- interpersonal skills,
- project management skills, and
- consultant skills.

We viewed these competency areas as being essential preparation for all educational systems design facilitators, both those going through graduate school and those who have been practicing for a long time. These seven competency areas should be taught and understood in an integrated fashion that reflects the context in which they are applied. The seven competency areas span the chasm between the academic theoretical world, real-life practice, and

human and political realities. What should we teach system design facilitators? The following are our current suggestions for each of the seven categories mentioned earlier.

Systems Thinking

Systems thinking is a way of viewing the world. It is a discipline for seeing wholes, organizing patterns and relationships, and learning how to structure those relationships in more efficient, effective ways. Systems thinking gives those who know about it "eyes to see" the relationships and interconnections that those without systems thinking often miss. Systems thinking allows us to tackle problems that are complex, non-routine, and counter-intuitive.

Systems thinking includes understanding basic systems concepts such as inputs, outputs, feedback, open systems, closed systems, subsystems, super-systems, negative entropy, and system stress. Systems thinking involves understanding the principle of homeostasis or the tendency toward a steady-state. This is important so that a systems design facilitator can plan for the multiple counteracting forces that will be exerted to change the system back to its previous state. Systems designers should be able to: (a) recognize when they are dealing with a system, (b) identify the boundaries of a system, and (c) recognize how changing one part of the system will impact the whole system.

Competencies in systems thinking include being able to describe systems, create models of systems, and analyze systems. Training in systems thinking involves studying various types of systems: families, homes, schools, hospitals, businesses, transportation systems, social systems, economic systems, electrical systems, etc., and mastering conceptually the basic concepts of general systems theory.

Systems Design

Design competence refers to understanding the process of design and how it is carried out for designing educational systems. Design skills would include the ability to establish the boundaries of the design; define expectations, aspirations, purposes, and requirements of the system to be designed; create and evaluate alternative representations of the future system; describe the future system; and plan for the development of the system.

Systems design skills also includes facility with different design approaches and methods. These include the user-designer approach and the architect approach. With the user-designer approach, the facilitator would facilitate the process only and would not help make decisions about the new system itself. With the "architect" approach, the facilitator would be a part of an external, expert design team that would formulate an initial blueprint of the functions and

mechanisms (facilitation stages 8–10) based on data collected from the client design team (facilitation stages 1–7). The initial blueprint would then be brought back to the client design team for modification and refinement, perhaps in several cycles. It is also shared with the community for additional modification and refinement throughout facilitation stages 8–10.

Model building is another design skill. There is some model building and simulation software that allows students to diagram and simulate any system. One is STELLA II from High Performance Systems. This software is based on Jay Forrester's work at MIT on System Dynamics and enables the user to piece together generic building blocks of any dynamic system, as well as to define and simulate their underlying relationships. Systems design skills also include using the tools of design. For example, designers should be familiar with logical and informational flow-charts, network models, etc.

Change Management Skills

There is a large knowledge base in the literature that has developed around the human and organizational aspects of change. This knowledge base is represented in books by Hall, Conner, Fullan, Hillary, and others (see resources in the Appendix). This knowledge base must be skillfully and consistently applied in any large-scale educational design effort that is to be successful.

Change management entails orchestrating the flow of change, guiding actions by asking such questions as:

- Who are the individuals and groups that are playing critical roles in the change process? (Targets, agents, advocates, and sponsors)
- Who is going to be first impacted by the change?
- How fast should we proceed?
- What is the organization's capacity to absorb this change?
- Where and when should we expect resistance and what are the appropriate ways to deal with it?

Concerns management is part of change management. Concerns management is a set of skills and techniques for assessing and addressing the individual and group concerns of those involved in the change process. Concerns management has been advanced as a science in the last 10 years by Gene Hall and his associates (see Appendix to this article). Hall's research has revealed that concerns tend to fall into categories and that the types of concerns evolve through distinct and predictable stages as the change process evolves. These stages include awareness, informational concerns, personal concerns, management concerns, consequence concerns, collaboration concerns, and refocusing concerns. Concerns management also includes practical prescriptions for handling each type of concern.

Group Process Skills

Education is highly decentralized and authority is shared among the state, community, district, and school levels. Active participation at all of these levels is critical to progress. Because of the wide sharing of authority, ESD facilitators must rely heavily on group consensus techniques to reach agreement on the vision, mission, and approach. All stakeholders must participate, including those who effect the changes and those who will be affected by them—the teachers, unions, legislators, taxpayers, parents, and students. In particular, a facilitator must have skills in building trust, managing conflict, building consensus, and empowering participants in the change process.

Interpersonal Skills

People are the most critical factor in bringing about educational change. Interpersonal skills are primarily communication skills that enable the ESD facilitator to communicate effectively person to person. Interpersonal skills begin with the ability to see the world (or a particular issue) from other points of view—to not only understand our own perspective, but to gain the ability to see things from the perspective of others.

Interpersonal skills include the development of good listening and communication skills, increasing an individual's own personal awareness, gaining and understanding of group dynamics, and the ability to establish social as well as business relationships. Steven R. Covey's book, *The Seven Habits of Highly Effective People* (1991), could be used as a resource here. Covey describes many of the "habits" that make professionals effective interpersonal communicators. Among his seven habits is the habit of "Think Win/Win" where the facilitator seeks unselfishly to make everyone benefit by the decision. To learn to think win/win, ESD facilitators must promote cooperation and unselfishness. Another of the basic habits is "Seek First to Understand, Then to Be Understood." Covey calls this "Empathic Communication." This habit provides ways to become a more effective listener and then to formulate one's own feeling in ways that can be understood by others. A third habit, "Synergize," deals with making the most of the diverse viewpoints inherent in human interaction—to turn diversity into building blocks for even more effective and powerful change.

Project Management Skills

Project management competencies include the ability to set objectives, plan, schedule, organize resources, establish appropriate staffing patterns, and control all of the complex processes that are required during the design and implementation stages of systems change. The 10 specific skills identified by Kerzner (1989) show what skills project managers need if they are going to be effective:

- Team building
- Leadership
- Conflict resolution
- Technical expertise
- Planning
- Organization
- Entrepreneurship
- Administration
- Management support
- Resource allocation

ESD facilitators will also need to be able to apply and use all of these skills. In addition, ESD facilitators will need to be skilled in using the new electronic and management tools that are entering the market daily. The new tools don't just make old ways of doing things easier, they have also changed the way we expect things to be done. New electronic tools that are relevant to the systems designer include project management and scheduling tools, system modeling and prototyping tools, system analysis tools, groupware, consensus building software, and information gathering tools such as Internet, GOPHER, the Wide Area Information Server, ERIC, and other broad based information networks.

Consultant Skills

Unless a facilitator is hired full-time by a school district, he or she will need consulting skills. These include: being able to convince a client (a school district) that they need you to help them in their restructuring effort; being able to determine whether the district and community have the necessary preconditions for a systemic change effort to succeed; and being able to negotiate appropriate terms of your agreement, as well as many of the skills already discussed above.

Additional Skill Areas

In addition to the seven competency areas described above, ESD facilitators will need skills in resource acquisition, professional development, facilities planning, and learning resource specifications and procurement. Each of these is discussed briefly next.

Resource Acquisition

Although it is likely that the restructured educational system will be considerably more cost-effective than the current system, the systemic change process is an expensive one. Designing a new educational system takes time, and "retooling" facilities, personnel, and learning resources is likely to be expensive. Therefore, most school districts with which a facilitator works are likely to need help in acquiring additional funds, as well as contributed time from interested stakeholders. This will require some competence in proposal writing

and some knowledge about potential sources of funding on local, state, and national levels.

Professional Development

Teachers and administrators will all likely need to be retrained for new roles in the new educational system. While a facilitator does not need to be competent at conducting professional development to provide such retraining, she or he does need to know fundamentals about analyzing training needs and finding qualified people to develop and conduct the needed professional development activities.

Facilities Planning

Systemic reform will require changes in the way we build and use physical facilities. As with professional development, a facilitator does not need to be competent at facilities planning, but she or he does need to know fundamentals about analyzing facilities needs and finding qualified people (primarily architects) to do the facilities planning.

Learning Resource Specifications and Procurement

A facilitator needs to have some skills for helping teachers to develop specifications for learning resources. She or he also needs to have information about vendors and their currently available learning resources, including computer and multimedia equipment and software. And a facilitator needs to have information about competent instructional developers who can work with teachers to develop new learning resources when suitable ones cannot be found.

Books and Other Resources

Some of the books and other resources that are now available and could be used in a professional development program in educational systems design are listed in the Appendix. Although the list represents only a sample of possible resources on systems thinking and systems design skills, it includes resources that pertain to the wide range of skills requisite for ESD facilitators.

Conclusion

We observe an increased interest in educational systems design and increased future opportunities for becoming involved in large-scale educational change efforts. A major task associated with this increased opportunity is to create a cadre of graduate programs in educational systems design for professionals who wish to obtain the skills needed for large-scale educational systems design work. Graduate programs in instructional design and technology seem to be in the best

position and most inclined to forge ahead into this new area of professional development. We feel that the recommendations provided in this article offer a viable starting point for training in the content and skills that will be needed by this new generation of professionals. □

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Appendix:

Books and Other Resources

Books on Systemic Change

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Other Resources

Change Management

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