

ARTICLE

Curricular Change in Medical Schools: How to Succeed

Carole J. Bland, PhD, Sandra Starnaman, PhD, Lisa Wersal, MA, Lenn Moorhead-Rosenberg, PhD,
Susan Zonia, PhD, and Rebecca Henry, PhD

ABSTRACT

Society's changing needs, advancing knowledge, and innovations in education require constant changes of medical school curricula. But successful curricular change occurs only through the dedicated efforts of effective change agents. This study systematically searched and synthesized the literature on educational curricular change (at all levels of instruction), as well as organizational change, to provide guidance for those who direct curricular change initiatives in medical schools. The focus was on the process of planning, implementing, and institutionalizing curricular change efforts; thus, only those articles that dealt with examining the change process and articulating the factors that promote or inhibit change efforts were included.

In spite of the highly diverse literature reviewed, a consistent set of characteristics emerged as being associated with successful curricular change. The frequent reappearance

of the same characteristics in the varied fields and settings suggests they are robust contributors to successful change. Specifically, the characteristics are in the areas of the organization's mission and goals, history of change in the organization, politics (internal networking, resource allocation, relationship with the external environment), organizational structure, need for change, scope and complexity of the innovation, cooperative climate, participation by the organization's members, communication, human resource development (training, incorporating new members, reward structure), evaluation, performance dip (i.e., the temporary decrease in an organization's performance as a new program is implemented), and leadership. These characteristics are discussed in detail and related specifically to curricular change in medical school settings.

Acad. Med. 2000;75:575-594.

Just as a continual stream of new technologies and discoveries brings advancements to patient care, so do innovations in teaching methods and curricular design constantly evolve to provide students with "cutting-edge" curricula. But implementing curricular change to

incorporate these innovations is often a challenge even for dedicated medical school personnel who strive for the highest possible quality in their programs. This article, a report of a literature review, is intended to help those who are promoting or intending to promote curricular change by identifying key characteristics that have been found effective in facilitating successful and enduring curricular change in medical schools and other educational settings.

Because many of the recent efforts to change medical school curricula have been in primary care, we focused on that literature. We also drew from reports of curricular change from kindergarten through the twelfth grade and in higher education, as well as the rather substantial published accounts of organizational changes in business and elsewhere. These areas have rich literature bases that identify characteristics that contribute to successful curricular change. Finally, because "leadership" is one of the factors we found was most often cited as affecting curricular change, we gave that characteristic special attention, searching for sources specifically relating to leadership of curricular change in higher education settings.

Dr. Bland is professor, Department of Family Practice and Community Health, University of Minnesota (U of M) Medical School, Minneapolis, Minnesota; **Dr. Starnaman** is associate professor, Institute for Public Policy and Social Research, Colorado Mountain College, Salida, Colorado; **Ms. Wersal** is research fellow, Department of Family Practice and Community Health, U of M Medical School; **Dr. Moorhead-Rosenberg** is financial development director, American Red Cross, Boise, Idaho; **Dr. Zonia** is administrative director of medical education, Botsford General Hospital, Farmington Hills, Michigan, and specialist at Michigan State University College of Human Medicine (MSUCHM), East Lansing, Michigan; and **Dr. Henry** is professor, Office of Medical Education, MSUCHM.

Correspondence and requests for reprints should be addressed to Dr. Bland, University of Minnesota Medical School, Department of Family Practice and Community Health, Box 381, 516 Delaware Street SE, Minneapolis, MN 55455-0392; e-mail: (bland001@tc.umn.edu).

For related articles, see pages 595 and 623.

THE SEARCH PROCESS

In gathering appropriate sources for this review, we first sought direction from an expert in the field of curricular change, Karen Seashore Louis, professor of educational policy and administration at the University of Minnesota. She guided us to literature on changes in school and organizational settings from kindergarten to the twelfth grade (K–12) to provide grounding in organizational change in general, and educational change in particular. Those sources led to others via their bibliographies.

Once we had established a firm base in organizational and K–12 school-change literature, we then utilized the First Search databases Medline (1966–present), ERIC (Educational Resources Information Center, 1966–present), Education Abstracts (1983–present), and the University of Minnesota Libraries Catalog (MNCAT) to search specifically for literature on changes in medical education. Each database was searched using the key words “medical education and change.” Within ERIC, this first search yielded 1,214 “hits.” So for this database we further refined our search to the key words “medical education and curriculum change” and the dates 1984 to 1999, which reduced the hits to 158.

Many of the articles that resulted from these preliminary searches were eliminated on the basis of their abstracts, because they did not address our topic of how to bring about successful curricular change. Other articles had abstracts that sounded on-topic and thus were read in their entirety, but many of these were set aside as well when found not to address our specific concerns. A goodly number of articles that were generated through our search using the terms “medical education and curriculum change” had to do with undergraduate preparation for medical school. To eliminate these articles, we further limited our search by adding the words “not undergraduate” to our search terms. This refinement eliminated articles having to do with premed college programs. Through this series of refinements, we culled out 25 pertinent sources from this portion of our search to abstract and rate for inclusion in our review.

Next we searched ERIC (1966 to present) for relevant sources from higher education literature, using the search terms “higher education and curriculum change.” As these terms yielded 5,086 hits, we limited our search to “U.S. higher education and curriculum change,” which brought the list down to 189. The abstracts of these 189 were reviewed, and only two were found to contain information about how to manage the change process. These two were reviewed in their entirety.

To ensure thoroughness in our searching techniques, we also searched ERIC, Medline, and WorldCat (all from 1985 to present) utilizing one of the most frequently cited factors unearthed in our review of the curricular change literature: leadership. We

searched using the key words “leadership and curriculum change and higher education.” Finding only one additional appropriate source to add to our existing body of literature, we felt confident that the searches we had already conducted had revealed the literature most pertinent to our topic.

Many of the articles dealing with change in medical education are brief accounts of new program requirements and/or reports of the outcomes of change efforts in terms of numbers of graduates in programs. Because our focus was on the process of planning, implementing, and institutionalizing curricular change efforts, we chose only those articles that dealt with examining the change process and articulating the factors that promote or inhibit change efforts.

All sources meeting our stated focus were read and abstracted using the following format: citation; organization type; factors cited that relate to change; key findings; and quality of the article or book on a scale of excellent, good, fair, and poor. We developed scales to rate the quality of the literature we reviewed (one for reports on original research and one for literature reviews) to ensure that we synthesized only the most trustworthy and generalizable literature. Original research efforts were considered of highest merit when they were conducted at several sites, had comparison groups to distinguish between organizational efforts that contributed to change and those that did not, demonstrated a systematic and thoughtful method, and were grounded in theory. For literature reviews, the criteria for the highest rating were clear explanation of the methods employed in the literature search and synthesis, comprehensive coverage of the literature, and a sound grounding in theory or contribution to model or theory building in the field. Each resource was evaluated as to both the presence and the strength of execution of each criterion. Separate ratings of the criteria were then synthesized into a composite score for the source. Position papers on the topic were not included in our review.

The literature search was determined to be exhaustive when extensive redundancy of information or viewpoints had been achieved. In total we reviewed and abstracted 57 sources: 29 were sources suggested by Karen Louis, known to the authors, or found in bibliographies of recommended sources; 17 came from Medline; eight came from ERIC, and three came from MNCAT. Of these 57 sources, 44 (77%) met our criteria for ratings of “excellent” or “good” and were thus included in our review. Three sources (5%) were rated “fair,” another three (5%) were rated “poor,” and seven sources (12%) were position papers that were set aside. The 44 sources that we used are given in the reference list: items 1, 2, 6 through 16, and 18 through 48.

FRAMEWORK FOR OUR FINDINGS

Before listing and describing the factors that affect the process of curricular change, we give below some essential def-

initions and an organizational framework to guide the reader through our presentation. Specifically, we provide definitions for four distinct stages of change, drawing from the many sequential stage models for organizational change that are used to guide research.¹⁻⁵ Some of our sources referenced such stage models in discussing their findings, and some even focused their research to a particular stage. Others spoke more broadly about the change process as a whole, and identified characteristics that were conducive to innovation in general. Given authors' variations in the use of models and the varied terminology in referring to stages, we clarify the terms and their meanings that we apply in this review. When it is appropriate to explicate a particular stage of change, we use the following terms:

Planning. During this stage, the need for change is established, a vision for change is designed, and the organizational context for change is considered.

Initiation (also referred to as *mobilization* or *adoption*). During initiation, which follows planning and generally lasts about a year, one would observe the “unfreezing” of old organizational patterns and the introduction of the innovation into the workplace or education environment.

Implementation. This stage typically refers to the years following initiation and leading up to institutionalization. During this time the innovation continues to be put into practice in the workplace or education environment, acquiring modifications and adjustments through trial and error.

Institutionalization. This stage refers to the time when the innovation has become the “new order” of organizational behavior. It is the time when the organization's members no longer refer to the innovation objectives as the “new” way of doing things, but rather refer to them as, “the way we do things.” It is sometimes called a time of “freezing” desired behaviors, in contrast to the “unfreezing” of undesired behavior patterns in the initiation stage.

Because of the variation among stage models in the articles reviewed, we chose not to utilize a stepwise model to organize our presentation of the factors that affect the process of curricular change. Our listing of characteristics is not intended to be viewed as sequential; in fact, the order in which one attends to the various factors will depend on the organizational setting and the nature of the innovation. Also, factors are often revisited as the change process proceeds. Still, we wish to provide an organizational framework to guide the reader through our presentation. Thus, we cluster the factors into three groups:

Context. This includes characteristics present in the organization that facilitate change. Factors discussed in this cluster

are mission and goals, history of change in the organization, politics, and organizational structure.

Curriculum. This includes characteristics pertinent to the curriculum itself. Factors discussed here are the need for change and the scope and complexity of the innovation.

Process. Process includes characteristics that relate to the process of implementing curricular change. Factors discussed are cooperative climate, participation by organization members, communication, human resource development, evaluation, performance dip (i.e., the temporary decrease in an organization's performance as a new program is implemented), and leadership.

Finally, it is important to mention that one of the characteristics of successful innovation—curricular or otherwise—is that the innovation and strategies used to implement it must be appropriate to the context of the organization and its environment. For this reason, most studies of organizational change, be they based on corporate or educational settings, do not claim that their results are necessarily transferable to other organizations. Still, we found remarkable consistency across disciplines and settings with regard to the characteristics associated with successful change efforts. Because common characteristics emerged across the varied settings and circumstances, we do not differentiate according to setting when relating authors' findings. The frequent reappearance of the same characteristics in varied fields and settings attests to their overall robustness as contributors to successful change. The next section, “Our Findings,” lists and describes the characteristics that we found consistently associated with successful and enduring curricular change.

While some characteristics of successful change listed may be so familiar as to seem fairly obvious, others may provide insight into the dynamics of phenomena that are experienced during change but not fully understood. Common pitfalls that arise from misunderstandings are revealed.

OUR FINDINGS

The review revealed 13 categories in which 35 features of successful curricular change were consistently reported. The following briefly discusses the categories and features, which are organized under the three broad areas mentioned earlier: context, curriculum, and process. (The categories and features are summarized for quick review in List 1.) In the Discussion section of this article we provide information as to which of these features may be most essential for successful curricular change.

Context

Successful change depends on choosing appropriate innovations and implementation strategies that fit the unique

List 1

Brief Descriptions of 35 Features of Successful Curricular Change, in 13 Categories

CONTEXT

Mission and Goals

Successful innovations must be compatible with the institution's mission, goals, and educational philosophy.

History of Change in the Organization

Educational institutions with a history of effective change are more likely to implement new innovations successfully.

Politics**Internal Networking**

Successful change efforts are characterized by:

- (a) having a strong, influential advocate at the forefront of the change effort.
- (b) gaining the "buy in" of powerful individuals or factions of the organization.

Informal networks are often the preferred means of negotiation of power issues in medical schools.

Resource Allocation

When external funds are used to initiate change projects, care must be taken to ensure that support for the change effort continues once the initial external support runs out.

External Relationships/Support

External support from foundations is a common means of funding curricular change efforts in medical settings. Tracking the innovation's success is useful in leveraging funds for the continuation of the program.

Organizations are advised to link their proposed innovations to the interests and needs of their constituents. Identifying mutual goals, committing to a shared vision, and establishing communication protocols between external bodies and the organization increase the effectiveness of innovative efforts.

Organizational Structure

Organizations with high interaction, connection, and networks of participatory teams are better able to accomplish broad change than "segmental," "departmentalized," or "loosely coupled" organizations.

Organizations with segmental structures can accomplish curricular change by utilizing cross-departmental teams and thereby partially bypassing departmental control.

CURRICULUM

Need for Change

In order for change to occur and be lasting, there needs to be widespread agreement that the innovation is relevant to the real problems that potential users currently experience.

Scope and Complexity of the Innovation

Avoid the extremes of trivial trial projects or overly ambitious undertakings. A balanced approach that engages the organization members' commitment and support will be most successful.

Successful innovations are large enough to justify the human and financial costs of the effort, but not so large as to lead to distortion of the innovation or only partial institutionalization.

Continued on next page

List 1 (Continued)

PROCESS

Cooperative Climate

The importance of a positive, respectful work climate to successful curricular change cannot be overstated.

Features of change-conducive environments include interpersonal respect, support, and cohesion balanced by constructive criticism and high professional expectations.

Change-conducive organizations are also characterized by collaborative problem solving, rewards for risk taking, and skillful conflict resolution.

Participation by the Organization's Members

As organization members invest themselves in the project through their participation, they strengthen their collective ownership of the project and deepen their commitment to see the innovation through to completion.

Public opportunities to declare agreement with the innovation help build the group's resolve to move forward. Faculty forums, retreats, orientations, problem-solving teams, and committees are examples of means through which to invite faculty involvement.

Communication

Successful innovation is fostered by frequent, timely, substantive, and forthright communication that is shared in a variety of verbal and written forms, both formal and informal.

Communication among participants contributes to the coalescence of a shared meaning and a unified purpose.

It is vital for the change leader to be visible, proactive, and responsible in communicating a clear vision. The leader should also provide regular updates on the group's progress toward stated goals.

Two forms of communication found to be especially effective in medical schools are face-to-face interaction and demonstration of proposed teaching practices.

Allowing dissenters to air objections and concerns invites participation, establishes trust, affirms risk taking, may uncover legitimate concerns, and deepens individuals' investments in the change process.

Sharing insights and reflections on the innovation process during the final institutionalization stage helps recharge waning group energies. Institutionalization is also a time to reach out to newcomers and cultivate new leaders.

Human Resource Development**Training Support**

For change efforts to be most effective, the organization must be attentive to the particular needs that arise as members move through the change process. Support provided should be appropriate to the culture of the school and the nature of the innovation.

Training support must be ongoing and of high quality. As follow-up practices to in-service training, peer coaching and team problem solving will significantly enhance the implementation of new behaviors.

Leadership training is necessary for continued cultivation of new leaders, especially in settings where personnel may not have previously needed to develop leadership skills.

New organization members must be "brought up to speed" on the innovation process, so they do not inadvertently weaken or disrupt progress already made.

Continued on next page

List 1 (Continued)**Reward Structure**

The organization's reward structure must include incentives that reward participation in the innovation.

In medical settings, approaching curricular change as an "experiment" elevates the innovation in the eyes of participants to a process deserving of the organization's investment of effort and resources.

Evaluation

An evaluation done well serves to legitimize the innovative process by holding it to standards of analysis that the faculty regard as valid and meaningful.

Formative evaluation is useful in locating difficulties and solving problems, in fostering open communication and a cooperative climate, and in renewing commitment to and "ownership" of the project.

Performance Dip

As a new program is implemented, a period of decline in organizational performance often occurs. During this time, strategies that lead to successful innovation include acknowledging grieving over losses associated with the old curriculum, celebrating successes, providing professional assistance, making minor adjustments in the process, and continuing to monitor progress toward organizational goals.

Leadership**Leadership in General**

Stable leadership is positively associated with successful innovation.

Leadership Characteristics and Behavior

Essential characteristics of effective change leaders are to utilize assertive participative and cultural/value-influencing behaviors, to be "flexible," to view the organization through a variety of perceptual "frames," and to mobilize others to maintain the change momentum.

Leaders' Advocacy of Organizational Vision

Leaders must effectively communicate and promote the organization's shared vision for curricular change.

circumstances of the organization.^{2,6-9} We return to this idea again and again in this review, because all of the factors we discuss are influenced by the particular circumstances of the organization that is implementing change. Even similar organizations in different contexts take different paths in innovation. Specific aspects of organizational context that are discussed next are mission and goals, history, politics, and organizational structure.

Mission and goals. The underlying beliefs and values of an organization are expressed in its mission and goals. Successful innovations must be compatible with the institution's expressed values, beliefs, and purposes. In educational settings, the mission and goals of the school, the espoused educational philosophy, and the institution's culture are all essential components to consider when envisioning a change.^{2,10-13}

The results of an ethnographic study of ten medical schools by Ross and Fineberg exemplify the close ties between mission, institutional culture, and innovation.¹⁴ These investigators found that the smaller medical schools in their study, which had more focused missions (to prepare generalist practitioners, for example), could more readily implement institution-wide innovations than could larger schools with more comprehensive missions. The larger schools were more likely to introduce innovations of narrower scope. Ross and Fineberg attributed this to the fact that larger schools pursue a plurality of missions, including training in specialty practices, a variety of research efforts, and staffing of hospitals. Each department then has its own unique mission(s) within the institution, and each enjoys considerable autonomy in carrying out its mission(s). In such settings, where departments operate quite independently in pursuit of their

specialized goals, it is more difficult to focus faculty attention on institution-wide innovations.

History of change in the organization. An organization's prior history with implementing innovation influences that organization's subsequent change efforts. For example, Corbett, Dawson, and Firestone found that educational institutions that had histories of effective change were more likely to implement new innovations.¹⁵ Furthermore, Miles and Louis report that a history of successful innovation will positively influence the institutionalization of change, that is, making the change a lasting part of the organization.¹⁶ Fullan and Stiegelbauer discuss the influence of the history of change as well.² They find that organizations that have histories of failed change efforts are particularly unlikely to incorporate innovations.

Politics. Political issues revolve around the allocation of scarce resources—"who gets what, when and how."¹⁷ Controlling decisions, or at least having the "right connections" with those that do, and being able to mobilize needed resources are examples of political variables. The three political components that emerged as the most salient for curricular change in medical schools are internal networking, resource allocation, and an institution's relationship with its external environment.

Internal networking. Power is most simply explained as the ability to affect organizational outcomes either by possessing the authority to make decisions or by influencing those who do. In educational settings, we refer to influential individuals or subgroups within the organization and/or external groups that may affect the organization's operation. These groups or individuals may exercise their power through formal or informal channels. In medical schools, informal networks are often the preferred means for negotiation of power issues. Internal power bases may be found among the faculty, administration, or students; and external power alliances may be forged with other medical schools, foundations, unions, professional associations, or community, state, or federal governing bodies.

Lippitt and colleagues suggest that planned organizational change must have at least one strong advocate who exercises personal influence through a variety of strategies, such as assertive persuasion, awarding rewards or punishments, building trust, and enthusiastically demonstrating support for the common vision.¹⁸ Furthermore, they find that if change is to be enduring, powerful individuals or factions within the organization must eventually cooperate with the change effort, even if they are not early advocates of the process.

In addition to faculty and administrators, students can be an important base of support during curricular change. Lindberg reports that students can be very persuasive in eliciting faculty support for curricular change.¹⁹ Grayson and associates and Rollins and colleagues similarly report that medical

students' feedback and enthusiasm have helped sustain the momentum of change in some settings by "pushing" the faculty forward.^{9,20} Sometimes students even assume leadership roles.²¹

One power issue that has arisen in curricular change efforts is the question of who "owns" or "controls" the curriculum: the school or the faculty. Some schools have written senate guidelines that clarify this issue; others are still struggling with it. Some have settled the dispute by agreeing that faculty members own the course content, but not the methods of instruction. This agreement serves to pave the way for curricular change in cases where innovations focus on teaching methods and not course content.¹⁹

Resource allocation. The method of allocating resources within medical schools tends to promote a system of departmental autonomy. Research funding is awarded for specific faculty research activities that further the department's discipline. For example, patient revenues typically go to the department whose faculty are providing care, and graduate education dollars for federal reimbursements of affiliated hospitals typically go to the department in which the resident is being trained. This being the case, department interests and research- and clinic-revenue imperatives tend to take precedence over the achievement of institution-wide educational goals.¹⁴

Acquiring the necessary funds to launch a curricular change project may require establishing partnerships with external organizations, such as foundations.^{20,22} While foundation-supported curricular change initiatives are common, reliance on external funding to initiate and implement change may have negative ramifications for the institutionalization of the change effort.² As the innovation progresses, care must be taken to garner sufficient funds from other external sources, or through internal appropriation, so that support for the change effort continues once the initial grant support runs out. Tracking of the innovation's success through ongoing evaluation mechanisms can prove useful in leveraging funds for the continuation of the program.

Relationship with external environment. Several researchers recommend that organizations link their innovations to the needs of their clients and supporters and involve their external constituents in the change process from the earliest stages on. Identifying mutual goals, committing to a shared vision, and establishing communication protocols between external bodies and the organization open the door for continued guidance and support.^{7,11,16,22,23} Glaser and colleagues find that having internal structures and procedures for monitoring "the pulse" of the larger community helps organizations adjust to external environmental imperatives as they implement innovation strategies.¹ Studies of K-12 school changes find that where communities and schools actively work together, the community can be an invigorating force for change, making

innovative efforts all the more effective.^{2,24} Miles and Louis report that institutionalization of school change is augmented when the innovation is congruent with the interests, goals, values, and ideology of the community it serves.¹⁶

In the case of medical schools, external supporters may include government bodies, accrediting agencies, scholarly societies, health professions organizations, and managed care organizations, as well as the geographic community in which the school is located. Kantrowitz and associates recommend developing relationships with other medical schools that are engaged in similar innovations to exchange ideas, share successes, and solve problems together.²² The W. K. Kellogg Foundation's Community Partnerships Project is one example of health professions schools partnering with local communities to accomplish curricular change. In this initiative, an advisory board of academics and community leaders oversaw each project site. Often, community representatives comprised over 51% of the board at a given site. Richards credits effective coalition building between medical institution leaders and community groups as key to the impetus and continuing support for curricular change.²⁵

Organizational structure. The highly autonomous departmental structure found in medical schools presents a challenge to institution-wide curricular innovation that requires integration and collaboration among departments. Research on the relationship between organizational structure and successful organizational change explains why.

Researchers point out that "integrative" or "closely linked" organizational structures are more amenable to institution-wide change than are "segmental" or "loosely coupled" systems. Kanter, for example, finds that organizations with "integrative," fluid boundaries between departments better facilitate the free flow of ideas than do rigid, "segmental" departmental structures.²⁶ Rogers, too, notes that innovations and new ideas spread more effectively across departments when there is a higher degree of interconnection and interpersonal networks among units.⁸ Studies in K-12 settings corroborate Kanter's and Rogers's findings from the corporate world. Corbett and colleagues and Rosenblum and Louis find that K-12 teachers' commitment to organizational change is directly related to the degree to which their work is integrated with that of other teachers.^{15,24} These two studies also link departmental integration to the durability of change, finding that greater integration facilitates more lasting change.

In organizations with loosely coupled work units, change may be easy to implement in one area, but then prove difficult to spread.²⁷ Segmented, loosely coupled systems are not at a total loss, however, when it comes to implementing organization-wide innovations. Rosenblum and Louis find that decentralized, loosely coupled systems may still be successful in effecting change if there is sufficient positive interaction among units. What constitutes "sufficiency" will

vary from institution to institution.²⁴ In general, segmentalized models are seen as less able to accomplish broad change in comparison with models with high interaction, connection, and participatory, team-focused networks.^{16,28}

Recognizing the need for more "integrative" structures to facilitate change, medical schools meet this challenge in creative ways. Kaufman, for example, describes the establishment of an interdisciplinary curriculum task force and a new, integrated governance structure to oversee curricular change.²¹ Cohen and others also describe circumstances in which it can be prudent for a school to establish a curriculum task force outside "the traditionally cumbersome, turf-conscious education policy committee."^{29,p.355} This sentiment is echoed by Hendricson et al., who find that task forces can best address curricular issues by circumventing departmental territorial infighting.³⁰

In some medical schools, where proponents of change find the "walls of resistance" to curricular change too "impenetrable," a separate innovative track of study has been developed to operate concurrently with the more traditional medical education track.^{22,p.19} Such efforts have been found to be successful because they involve faculty from many different departments and partially bypass departmental control. They also provide a sheltered environment to try out new strategies, and they create a means for comparison between the traditional and innovative education tracks.

Curriculum

The next two factors influencing successful curricular change address establishing the need for curricular change and then deciding on the scope and complexity of the change initiative. These activities occur in the planning stage of an innovation. However, these actions will likely flesh out concerns and considerations that may need to be revisited as the change process proceeds.

Need for change. It may seem self-evident that an organization would not embark on an innovative path without first identifying a bona fide "need" for change. What is not always recognized is that it is not enough for the administrators or board of directors to recognize that need and call for change. In order for change to occur and be lasting, there needs to be a widespread agreement that change is requisite.^{2,27} Change efforts require a considerable commitment of time, energy, and resources, often more than originally anticipated. In order to initiate and sustain the momentum of change, the relative advantages of implementing an innovation must be seen to outweigh the costs. Widespread dissatisfaction with the status quo, for example, establishes a sense of urgency for change that propels the project forward.¹

Sometimes the impetus for change originates outside the institution; at other times the need for change comes from

within. What is key is whether the change meets the standards of "reality and utility."^{31,p.27} That is, the innovation must appear relevant to its potential new users for dealing with real problems that they experience. The degree to which participants clearly understand the proposed change and believe that it holds promise for genuine improvement of the status quo will impact their likelihood of employing the innovation.

Louis also notes that the centrality and quality of the innovation affect its success.¹³ The more central an innovation is to the core operation or mission of an organization and the higher the perceived quality of the innovation (if it is associated with an esteemed expert or grounded in sound evidence, for example), the greater its chance for successful implementation.

Scope and complexity of the innovation. In planning a change strategy, one of the initial questions to deal with concerns the scope and complexity of the change effort. Should it involve the entire organization and be fairly complex, or should the organization start with a "pilot project" of limited scope?

Some researchers note the successful use of "pilot," or trial, initiatives because the phased-in, incremental process is less disruptive and anxiety-provoking for the organization members involved than a sweeping, organization-wide initiative would be.^{9,20,32} However, other researchers offer some provisos to the use of "pilot projects." Successful innovation is built on the active participation of an organization's members. If a test project is judged "trivial," it will not have the engaging quality necessary to garner members' commitment and support. Small projects of limited scope are more easily shelved or dropped without controversy because people are not deeply invested in them.^{28,31}

On the other hand, innovative projects can also err by being overly ambitious. If available energies and resources become overextended, the change initiative may fail or be only partially institutionalized.^{2,31} Crandall and colleagues advise that organization leaders be attentive to their organizations' contexts and choose a balanced approach: "from an organizational perspective . . . the greatest success is likely to occur when the size of the change is large enough to require noticeable, sustained effort, but not so massive that typical users find it necessary to adopt a coping strategy that seriously distorts the change."^{31,p.26} While innovations that are complex and broad in scope may pose difficulty in implementation, they succeed best when broken into small steps.²⁸

Process

Sometimes organizational leaders err by believing that the planning stage of an innovation is the "hard part" and that

the initiation and implementation of change will be easier. In truth, each stage of change presents unique and unanticipated challenges, and the process of implementing change often takes longer than expected. The following factors of cooperative climate, participation by organization members, communication, human resource development, evaluation, the performance dip phenomenon, and leadership provide insights on how to support organizational members through what is often a lengthy and demanding process.

Cooperative climate. The work climate of an organization can greatly influence the change process. Eastwood and Louis report that a cooperative environment, characterized by collaborative problem solving, harmony, effective communication, and skillful conflict resolution, is essential for successful organizational restructuring.³³ Lippitt, Langseth, and Mossop, and Colwill, Perkoff, Blake, Paden, and Beachler also note the importance of collaboration.^{18,34} Colwill and colleagues report specifically on the necessity of bringing individuals of different disciplines or departments together to plan and implement curricular innovation in medical schools. Interestingly, organizational change itself, if properly managed, can be the impetus for the creation of a collaborative organizational environment.³⁴

Engaging in the change process requires that one put aside familiar practices and adopt new ones. Thus, a period of change can be a challenging time of uncertainty and even discomfort for organizational members. To assist them in venturing into unknown territory, participants need assurance that they can try out new behaviors without fear of punishment if their first attempts at innovation fail. Several researchers note that institutions that reward risk taking foster an innovative climate.^{19,23,28,35} Corbett and colleagues, Little, and Fullan and Stiegelbauer all associate a culture of collegial support and interpersonal bonding with successful change.^{2,15,36} Rosenblum and Louis further find that the ability to air disagreements among colleagues helps to create an environment conducive to change.²⁴

In sum, the importance of a positive, respectful work climate to successful curricular change cannot be overstated. This is a robust characteristic consistently found also to contribute to high creativity and research productivity, which are often also important accomplishments of medical schools.³⁷⁻³⁹ In that innovation requires a steady stream of creative ideas as members practice new behaviors, a work climate that supports and enhances creativity would certainly likewise enhance innovation. Pelz and Andrews' research from the 1960s continues to be cited as an example demonstrating the increase in productivity that comes with an interpersonal organizational climate of "creative, supportive tension," in which enthusiasm, respect, and cohesion coexist with criticism and high professional expectations.³⁹

Participation by the organization's members. Numerous

researchers report that broad participation by an organization's members is an important feature in the change process.^{1,2,10,11,16,18,26,36,40} As an organization's members invest themselves in the project through their participation, they strengthen their commitment to see the project through to completion.^{19,28} Crandall and associates suggest that public opportunities to affirm and declare one's agreement with the proposed plan help build consensus and deepen the group's resolve to carry the plan forward.³¹ Participation also hastens members' skill development and increases the likelihood of the innovation's being formulated and implemented in ways appropriate to the organization's context.²⁷ Finally, Eastwood and Louis find that the stronger the participants' sense of collective ownership of a plan during the implementation phase, the greater the likelihood that the organization will successfully institutionalize the plan in the final stage of the change process.³³

While there is significant support for broad-based inclusion of the organization's members in all stages of the change process, some provisos are given. If planning and decision making infringe on other staff obligations, and especially if deliberations become overly cumbersome and prolonged, participation can be draining and frustrating, and therefore ultimately a "cost" rather than a "benefit" to the process.¹⁵ Furthermore, rank-and-file members tend to grant their leaders a certain "zone of trust" in decision making. Leaders need to be attentive to their organization's culture in this regard, and be prudent in deciding when and how to involve participants. Being overly reliant on participants in decision making can be just as problematic as being too dominant.²⁷

Methods for eliciting participation may include retreats, project orientations, or the use of team-focused problem-solving techniques.²⁸ Hendricson, Payer, Rogers, and Markus advocate the use of faculty forums and numerous subcommittees to allow ample opportunity for faculty involvement.³⁰

Communication. Many researchers note the necessity for effective communication during change to promote a shared meaning and understanding of the goals of the innovative effort, as well as to promote ownership of the innovation. In our discussion of mission and goals, we have already noted the importance of having innovation goals that are compatible with the overall goals of the organization. Goals, however, are multidimensional, as are organization members. Communication among participants ensures that a shared meaning will coalesce, and participants will formulate a common and unified purpose together. Through communication, goals are established, clarified, and then proclaimed.²

Researchers recommend that communication be frequent.^{2,41} Dannefer et al., for example, recommend "planned redundancy" in communication. They find that the use of a variety of methods and reiteration is much more effective

than one-time or single-medium approaches.⁴¹ The use of several methods promotes "ownership" by allowing people to "buy in" to the project again and again in varied situations: forums, meetings, and other interactions. Repeated reminders of goals and plans are important because people receive, integrate, and recall information selectively.

What kinds of communication are useful? All kinds: written and verbal, formal and informal. Newsletters, announcements, memos, one-on-one interactions, meetings, forums, bulletins, updates, and e-mail messages all have their places in the communication stream. Most important is that communication be succinct, frequent, honest, factual, substantive, and timely.³² Communication should build trust and clarity.^{18,41} If information is not delivered in a straightforward and timely manner, participants will form their own interpretations of what is happening, based on misinformation, innuendo, and hunches.

Of all the communication linkages, it is particularly crucial for the leader to be an effective communicator.^{2,42} Leaders must proclaim a clear vision of where the organization is headed and provide accurate updates on the progress toward those goals. Dannefer et al. find that it is vital for the leader to be visible, proactive, and responsible in communicating; he or she should not delegate this responsibility to others.⁴¹ In order to rally support and participation for the innovation, the leader must model enthusiasm and commitment.

Communication in medical schools. Two forms of communication were found to be especially effective in medical schools. The first is face-to-face interaction. Even in our high-tech society, there is no substitute for it. One-on-one interaction reduces the possibility of misunderstanding by allowing the opportunity for immediate feedback and clarification and also by having the added dimension of nonverbal cues.⁴¹ Given the "turf-protecting" consciousness often found in medical schools, personal interaction is especially helpful to assuage any guarded, territorial reactions to curricular change.

The second type of communication found especially useful in medical schools is demonstration. Lindberg and Mennin and Krackov reported that demonstration of proposed teaching practices brought more immediate understanding and more successful adoption of new teaching methods by faculty.^{19,40}

Airing dissent. Naturally, not all communication will be positive and reaffirming. Dissent, too, is to be expected, and forums should be provided for the airing of objections and concerns.^{19,41} In keeping with ideas mentioned earlier under "cooperative climate," participants must feel safe in taking the risk to express dissenting views. They must feel fully heard, be acknowledged for contributing to the ongoing discussion, and receive feedback. Objections can be very useful in identifying stumbling blocks in a plan and providing cre-

ative alternatives. Even the best of plans needs some adjustment as it is initiated. Listening to dissenters not only benefits the plan, but also invites the participation of plan opponents and deepens their commitment to the change process. As their ideas are heard and incorporated into the plan, dissenters become “planners.” They then have a greater stake in the outcome of the change process.

Another benefit evolves from allowing dissenters to air their views. Sometimes in the voicing of one’s concerns, one sees that one’s fears are ungrounded. Then the dissenter quickly “loses steam.” Alternatively, the dissenter may find no support for his or her position among other participants. Again, that individual, finding no audience, may quiet himself or herself. There is far greater danger in not allowing dissent to be expressed. Lindberg reports that in a situation in which detractors were circumvented and excluded from the process, pockets of resistance resurfaced again and again to hinder the organization’s effort for change.¹⁹ The lesson here is that even dissent should be regarded as an opportunity for individuals to deepen their levels of participation in and commitment to the change process.

Communication during institutionalization. The final stage of the change process, institutionalization, calls for special kinds of communication. High energy and enthusiasm often accompany the planning, initiation, and implementation stages of innovation, but after three to five years have passed, the energy and momentum begin to wane. Change is demanding and can eventually deplete the vitality of even the most committed of individuals. As institutionalization approaches, the organization probably needs to recharge. One way to do this is to provide forums for faculty to share their insights and their new ideas so that innovation continues to be part of the organizational milieu. Another strategy is to invite students to share their responses and reflections on the changes they have experienced in the curriculum. Also, efforts need to be employed to reach out to newcomers to the organization, to invite those individuals to embrace the innovation, and to cultivate new leaders from among the fresh recruits.⁴¹

Human resource development. Meeting the “human” needs of an organization’s members through open communication channels, opportunity to participate in fulfilling ways, and a fair reward structure fall under the area of human resource development. Human resource theorists maintain that people are more effective in their work when their needs for comfort, safety, respect, self-accomplishment, and meaningful relationships are met.⁴³ It follows, then, that for change efforts to be most effective, the organization must be attentive to the particular needs that arise as members move through the change process.

Change is a difficult and lengthy process, requiring sustained energy; it often takes longer than anticipated. In ad-

dition, change involves feelings of loss as old behavior patterns are set aside and feelings of anxiety, inadequacy, and uncertainty arise in meeting the demands of new procedures.^{2,12,40} Many researchers note that during change participants are especially vulnerable to burn-out, and need a variety of support mechanisms to assist them as they develop new skills and learn new behaviors.^{2,7,9,10,13,18–20,31,33,44} Crandall and colleagues suggest that support comes in three areas: affective (emotional support and reassurance), cognitive (clear understanding of the innovation and one’s part in it), and skills development (training and coaching).³¹

As important as training and other support mechanisms are, it is equally important to match the chosen development strategies to real staff needs, and to deliver support in ways congruent with institutional mores. Ruback and Witzke report that medical schools in their study found it challenging to both identify the faculty’s needs and also provide support appropriate to the culture of the school and the nature of the innovation.⁴⁵

Common training problems. An innovation is more likely to be adopted when the implementers, usually faculty, understand the theoretical underpinnings of the desired innovation and are trained in the skills required to implement it. For example, when implementing a new problem-based learning curriculum, it is important that faculty members be familiar with the underlying learning theory. For tying theory to practice, demonstrations of desired new behaviors can be especially cogent. Live demonstrations of how to conduct problem-based learning sessions and videotaped demonstrations of the use of curricular scripts in clinical teaching are two examples of the effective use of demonstration to build faculty members’ skill levels.¹⁹

One common error in the area of training is to believe that an initial training session, presented as a program is being launched, is “enough.” Joyce and Showers explain that follow-up coaching, coupled with opportunities to engage in problem solving with colleagues as new skills are practiced, can significantly enhance the implementation of new behaviors.⁴⁴ Training support must be ongoing and of high quality. In fact, Fullan and Stiegelbauer note that it is after trying to implement new skills and practices and experiencing frustration that individuals are in special need of additional support and coaching, so that they do not revert to their more familiar old patterns.²

Another common area of “lack” in training is in providing necessary support and skill building for leaders. Many people believe leadership abilities to be “inborn,” when, in fact, these are skills that can be learned and developed. Because the change process is long and demanding, new leaders must be recruited to “take over” when current leaders need rest and rejuvenation. Medical school personnel (whose primary roles have been, for example, in a laboratory or in providing

patient care) may not have previously needed to develop leadership skills, so leadership training for faculty may be especially appropriate for the continued cultivation of new leaders in medical school settings.²¹

It is likely that new members will join the organization during the change process. It is important that these new members be oriented and socialized to the ongoing innovation. One helpful strategy is to recruit new members known to be supportive of the innovation.^{19,42} However, even individuals supportive of the change effort need to be “brought up to speed” on how the implementation process is going in this particular setting. New members can unintentionally disrupt a fragile new program because they are not familiar enough with the organization’s culture or context. They could, for example, aggravate sensitive issues that have already been dealt with. Especially if new members are to assume leadership roles, it is important that they be grounded in the organization’s milieu, and that they ease in to the change process.²⁴

Just as special care needs to be taken with new members, “outsiders,” even expert consultants if they are employed, must be utilized judiciously. Staff must not become overly reliant on outside consultants. Rather, organization members must be trained to assume full responsibility for the project, so that things do not fall apart when the consultants leave.^{2,18}

Reward structure. To plan, initiate, and implement an innovation requires a redistribution of time and energy. If this redistribution is to be maintained, the organization must change its reward structure (that is, salaries, recognitions, tenure, and promotions) to entice members to continue to participate in the innovation. Several researchers discuss the need for an incentive system that rewards change.^{1,16,18,20,25} Kanter suggests that reward systems be viewed as an investment in the future productivity of the individual rather than as payoff for goals achieved.²⁶ Using this method, incentives come as seed money for proposed innovative activities, rather than as payoffs after the innovation is in place.

Providing rewards for participation in curricular changes in medical schools is particularly challenging. Excellence in teaching is not typically awarded the status or financial rewards that excellence in research brings, although in recent years some schools have given more credit for teaching in decisions about rewards, or have established new clinical-educator career ladders. Along with changing reward structures so that one’s teaching does factor into promotion, salary increases, and tenure decisions, Kantrowitz et al. suggest designing and promoting an innovative program as an experiment. This term elevates the innovation in the eyes of faculty and administrators from being a teaching chore to being a research study, deserving of the organization’s investment of effort and resources.²² “Experiments” are taken seriously in the scientific community.

Evaluation. Another way to elevate an innovation in the eyes of participants is to employ formative evaluation techniques to ensure close monitoring of the organization’s progress in implementing desired changes. In a medical school setting, where theories and practices are tested rigorously, an evaluation done well serves to legitimize the innovative process by holding it to standards of analysis that the faculty regard as valid and meaningful. Many authors use terms such as “critical” and “crucial” when referring to short- and long-term evaluation as part of the curricular change process in medical school settings.^{9,10,19,20,22,41,46}

Evaluation is always useful in locating difficulties, solving problems, or redesigning aspects of a program. So long as evaluation is accompanied by corrective action (and not just shallow coping strategies such as denial or people-shuffling), it can improve and reinforce the change effort.^{16,28} Because evaluation is a collaborative activity, it can contribute to fostering open communication and an organizational cooperative climate, as discussed earlier.³⁵

Dannefer and co-workers note that focus groups are a particularly effective evaluative technique, as the open dialogue of the focus group fosters renewed “ownership” in the project.⁴¹ Lindberg, Rollins et al., and Gerrity and Mahaffy report that positive evaluation results can be used to leverage increased support for the innovative effort, and to counter nay-sayers.^{9,19,46}

Reporting on the W. K. Kellogg Foundation’s Community Partnerships initiative involving curricular change at seven sites, Rebecca Henry comments that project evaluation served three important purposes: to provide information to various stakeholders, to refine and clarify elements of the program, and to “keep the change agenda alive.”^{47,p.149} The evaluation process provided opportunities for the witnessing and sharing of pivotal and sometimes dramatic incidents. Such compelling stories, when included in evaluators’ reports along with aggregated data, served to recharge participants’ enthusiasm.

Performance dip. The “performance-dip factor” refers to the often-noted decrease in an organization’s performance that occurs as a new program is implemented. Fortunately, over time, as individuals continue to receive support and master the necessary new skills, this temporary decline will reverse, and performance will reach new “highs.”³³ Eastwood and Louis suggest that during a performance dip leaders continue to provide professional assistance, monitor the organization’s progress toward the desired outcomes, and make adjustments where needed. Leaders are cautioned, however, not to allow so much restructuring that the reform program is subverted. Rather, Eastwood and Louis advise that leaders continue to press forward toward program goals. Recognizing small victories and celebrating day-to-day successes can help bolster morale during the “performance dip” period.³³ Cel-

celebrating each milestone and publicly recognizing individuals who are supporting the process are often cited as being integral to the change process.^{10,18,19,35,41} Although the change process often begins with uncertainty and uneasiness, if the innovation is successful, participants will likely also experience a sense of personal accomplishment in their mastery of new skills.²

Leadership. Leadership is one of the factors most often cited as affecting curricular change. It is so prevalent that Karen Louis states, "The *leadership factor* emerges even in studies that did not deliberately attempt to investigate it."^{13,p.945} Many studies that examine the change process find that organization members view the activities of the change leader as vital to successful innovation.² As an example, researchers investigating innovative curriculum tracks in eight medical schools found that in five of the eight institutions studied, strong leadership was identified among the top three forces supporting curricular change.²²

Leadership characteristics and behavior. In educational settings, the innovation leader is often an administrator who has working knowledge of the entire program. In medical schools, the dean frequently fills this role. In two separate studies of over 100 medical schools in the United States, Puerto Rico, and Canada, Hendricson et al. found that the leader in educational change was usually the dean.³⁰ Cohen and colleagues, Colwill and associates, and Mennin and Krackov also report that the most important facilitator of educational change in the medical school settings that they studied was the dean.^{29,34,40} This is not to say that others cannot serve as leaders; committee chairs, senior faculty, and associate deans are also likely candidates to lead change. Whoever the primary leader is, it is important for that individual to remain as the identifiable leader throughout the innovation process. Both Bland et al. and Miles and Louis identify stable project leadership as being positively associated with successful innovative projects.^{16,48}

Bland and colleagues (1999) provide further insight into the specifics of effective leadership in their study of seven projects engaged in changing health professions schools' curricula. Correlations between leadership behaviors and the subsequent positive or negative outcomes in change efforts were determined. They tracked 16 behaviors previously shown to be associated with leaders' effectiveness, and placed these 16 behaviors into four categories: (1) organizational power (e.g., uses organizational authority; provides rewards or allocates resources), (2) prestige/coalition power (e.g., uses professional/discipline expertise as perceived by others; empowers others through building coalitions), (3) assertive participative governance (e.g., actively and consistently seeks input from others; provides structural mechanisms for organization members to accomplish the mission),

and (4) cultural/value influence (e.g., articulates the stories or symbols that represent the underlying meaning or purpose of the organization; defines, shapes, and maintains the values of the partnership). Correlations between the frequencies of use of the individual behaviors and positive outcomes were determined.

Bland and colleagues found significant differences in comparing the leadership behaviors of individuals leading projects that resulted in more positive change outcomes with leadership behaviors of individuals leading projects with less successful outcomes. Specifically, the leaders of the more successful projects all used a consistent set of leadership behaviors, including frequent use of assertive participative leadership and cultural/value-influencing behaviors. Across all projects, leaders used organizational power behaviors, such as exercising their ranks or control of resources to influence organization members' behaviors, with the same frequency. However, the more successful leaders used organizational power behaviors less often than they employed participative and cultural/value-influencing behaviors.⁴⁸ In short, Bland et al. found that both successful and less successful leaders used organizational power behaviors at about the same frequency. However, the successful leaders more frequently accompanied their organizational power behaviors with use of participative and cultural/value-influencing behaviors than did the less successful leaders.

The personal characteristics frequently associated with effective leadership are those of a visionary, a champion, or an advocate for the innovation embodying the belief that "Where there is no vision the people perish" (from *Proverbs* XXIX, verse 8). The effective leader is a risk taker; someone who is influential, credible, energetic, enthusiastic, and who embodies and advances the values associated with the project; and one who uses an assertive participative leadership approach (that is, being flexible, willing to compromise, respectful toward others, and able to respond to challenges in a non-defensive manner).^{1,20,22,37,48} Skills that a primary leader needs include being able to manage conflict, to provide encouragement and positive reinforcement, to keep the project focused and moving forward in a timely manner, to use an assertive participative approach to leadership, to facilitate open communication among all project participants and stakeholders, to build trust, to honor diverse views and perceive situations from various points of view, and, perhaps most important, to build and effectively communicate a shared vision and culture/values.^{1,7,25,40,48}

Leaders' advocacy of organizational vision, and other leadership qualities of special note. A few leadership characteristics were noted so often in the literature that they deserve special attention here. These include sharing of power and leadership, flexibility, effectively communicating a shared vision, ability to view the organization through more than one per-

ceptual “frame,” and ability to mobilize others to maintain the momentum of change.

Because widespread support among participants is vital for an innovation’s success, the primary leader needs to be able to build broad-based support and cultivate and support innovative leadership from among participants: faculty, administrators, and even students. Change is a shared responsibility. Particularly as the change process proceeds, individuals with varied skills and areas of expertise need to be recruited to lead various sub-objectives of the project through to completion.^{2,19,21,22,25} The primary leader, then, needs to be able to share power without losing control, to be visible and active without dominating, and to delegate responsibility while continuing to offer support.²⁸

This points to the complex and paradoxical nature of leadership.^{2,6,48} As Fullan states, “leaders must alternately and simultaneously balance and contend with several dilemmas, paradoxes and subtleties.”^{6,p.404} Congruent with these balancing actions, the necessity for a leader to be “flexible” is noted by several researchers.^{2,19,23,48} An effective leader must honor the variety of realities that participants bring to the innovation process. The leader who has tunnel vision about how change occurs and who acts in ways that preclude other realities is likely to be unsuccessful. Fullan and Stiegelbauer state this succinctly: “Ironically, in many ways, the more committed an individual is to the specific form of change, the less effective he or she will be in getting others to implement it.”^{2,p.9}

On the other hand, a leader must not be so flexible that the integrity of the project is compromised. It is the leader’s responsibility to maintain and support the organization’s vision for change. Although the process of defining a new vision for the organization is at best a collaborative one, it is the leader’s responsibility to guide participants through the steps of unfreezing their old perceptions of their operation, generating a new shared vision, and then reaffirming that vision throughout the change process.^{2,25,33} Numerous researchers note the importance of the leader’s clear and repeated communication of the organization’s innovative vision.^{1,6,9–11,16,19,21,25,27,29,30,42}

We mentioned earlier the importance for the leader to be flexible in respecting participants’ differing views toward the change process. Bland and colleagues note that in order for the leader to do this, he or she must first be able to perceive the project from more than one perspective.⁴⁸ This research builds on the work of perceptual frame theorists Bolman and Deal, who posit four “frames” through which one commonly perceives one’s organization: “(1) structural—emphasizing formal roles and relationships, (2) human resource—oriented—focusing on the needs of people, (3) political—centering on conflict arising over scarce resources, and (4) symbolic/value-based—viewing organizations as cultures

with shared values.”^{43,48} Bolman and Deal suggest that leaders are best able to handle the variety of challenges that they encounter if they view any given situation through several perceptual frames, or “lenses.” Being able to operate effectively within several frames, to understand and appreciate the particular perspective (or frame) with which others are viewing an issue, and to discern which perceptual frame(s) offers the best solution(s) to a problem expands the leader’s ability to “hear” others’ perspectives and expands the leader’s repertoire of available solutions to any given problem. Bland et al. found that in the medical schools in their study, the most successful leaders employed at least two perceptual frames when viewing the circumstances of their projects.⁴⁸

Further, Bland et al. found that all of the successful change leaders in their study employed the human resource frame as one of their perceptual frames. As the human resource frame focuses on people’s needs, this finding dovetails with our emphasis in earlier sections of this review on the significance of open communication, broad participation, cooperative work climate, and human resource development.

One final point on leadership: Recall that while researchers emphasize the importance of broad-based participation, that participation must not become so ponderous that it drags down the change process. Louis and Miles suggest, for example, that no more than one year be spent in planning. They advise that participants’ support and commitment will grow along with the developing project. If the innovation process stalls, however, participants’ interest and support may plummet. Again, it is the leader’s responsibility to continually fuel the momentum of change.^{22,25,28,31}

DISCUSSION

State of the Literature

Before discussing our findings, a few statements about the literature itself are in order. First of all, we were surprised by the relatively small number of sources available that addressed the characteristics of successful curricular change in higher education in general, and in the professional education of physicians in particular. This is why we also sought out organizational change literature and K–12 curricular-change literature. Fortunately, there is a growing body of high-quality studies sponsored by The Kellogg Foundation and The Robert Wood Johnson Foundation’s Generalist Physician Initiative that have recently been published. These studies of medical curricular change provided some of our most recent and best reports. In fact, medical education research supplied the largest body of studies for this review. Of our 44 sources, 20 were articles or books about curricular

innovations in medical schools. Thirteen of these received our highest quality rating of “excellent,” and seven received the second-highest rating of “good.” Most were recent publications, with 16 of the 20 published in the preceding four years.

In casting a wide net in our literature search, we pulled together studies of varying consistency in terms of research design and guiding theories or models. Many of the original research studies we reviewed did not have standard research designs because common experimental design principles, such as randomization and replication, are simply not possible in educational settings. Our ratings of the quality of original research efforts, therefore, did not include criteria reflecting randomization and replication. Many of the literature reviews were also lacking in the area of design; few provided clear explanations of the methods employed in searching and synthesizing the literature.

In spite of the highly diverse literature reviewed for this study and the deficiencies in the literature noted above, a consistent set of characteristics emerged as being associated with successful curricular change. It is the robustness of these characteristics across disciplines and over time that impressed upon us their significance.

Our Findings

The characteristics identified in the previous section as ones supporting curricular change are found consistently across fields and at all levels of educational programs. They show up in the seminal literature on organizational change, as well as in recent reports of change efforts in medical schools. At first glance, the characteristics may not seem particularly striking. In fact, some might say they seem obvious. However, while these recommendations may seem familiar, they are easier said than done. “Staying the course” of successful change strategies is difficult, and overlooking any one of the strategy recommendations may become the Achilles’ heel of one’s innovation process. We wholeheartedly agree with Krackov and Mennin’s characterization of the innovation process as a “complex interaction among many elements,” and with their statement that “change is difficult to accomplish; it requires dedication, hard work, and the ability to recover when we inevitably falter.”^{12,p.53} Our intention in summarizing and synthesizing the literature on curricular change has been to help would-be change agents stay the course and avoid faltering.

Keeping on course in following 35 recommendations is a lot to ask of even the most dedicated change leaders. We wanted to see whether we could further refine this list and identify the *most essential* of these important elements. To this end, we re-examined List 1, which is a brief summary of the categories and features of successful curricular change

that we found in this study. We counted and tabulated the number of our sources who commented on one or more features of each category, in order to see which themes predominated in the literature. We made separate tallies according to the types and ratings of sources: original research that received an “excellent” rating, literature reviews that received an “excellent” rating, original research that received a “good” rating, and literature reviews that received a “good” rating. We also calculated the total sources of “excellent” or “good” quality that discussed each category of features, and, as subsets of those “grand totals,” we calculated totals of just the original research studies of “excellent” or “good” quality that discussed each feature category.

Six categories of features were found to predominate in the literature: leadership, cooperative climate, participation by organization members, evaluation, human resource development, and politics (see Table 1). All were present in between 25% and 61% of the total sources, and between 27% and 55% of the total original research sources. Within two categories (human resource development; leadership) certain subcategories had such strong showings in our counts that we also included them in the table. It is instructive to note the relative imports of the respective subcategories within each of these two categories. For example, references to human resource development were found in 48% of our sources; more specifically, 36% of our sources discussed the significance of training support, and 12% discussed reward structure.

While we note the strengths of these categories and subcategories by their frequencies in the literature, we acknowledge that our precision in this effort was hampered by the high variability of the literature. Some articles focused on only certain characteristics of change; some at only certain parts of the change process. Our counts are therefore skewed toward those aspects of change that people are choosing to focus on and write about. Furthermore, in stating that the strongest themes were found in at least 25% of the sources reviewed, we do not imply that these themes were absent in the innovation efforts that were discussed in the remaining 75% of the literature. The features may have indeed been present in other change efforts as well, but simply not identified and discussed in the literature. For example, the category of “need for change” had an 11% mention in the literature. From this, we cannot infer that identifying a bona fide need for change was not important to the success of the innovations discussed in the remaining 89% of our sources. Rather, the relatively low occurrence of this feature may reflect the fact that in change efforts that proceeded all the way to institutionalization, organization members had identified the need for change much earlier. Those writing up concluding reports may have felt that identifying the need for change was so fundamental to the innovation process

Table 1

Thirteen Categories of Features of Successful Curricular Change, Including the Six Considered Most Essential*									
Categories	Excellent Original Research	Excellent Literature Review	Good Original Research	Good Literature Review	Total Sources	% Total Sources	Total Original Research	% Total Original Research	
1. Mission/goals	3	0	1	2	6	14	4	12	
2. History of change in the organization	0	1	0	2	3	7	0	0	
3. Politics	8	2	4	1	15	34	12	36	
4. Organizational structure	6	0	2	2	10	23	8	24	
5. Need for change	0	2	0	3	5	11	0	0	
6. Scope and complexity of the innovation	3	0	1	2	6	14	4	12	
7. Cooperative climate	7	1	3	3	14	32	10	30	
8. Participation by organization members	7	2	2	6	17	39	9	27	
9. Communication	3	0	3	1	7	16	6	18	
10. Human resource development	10	3	6	3	22	50	16	48	
Training support	8	1	4	3	16	36	12	36	
Reward structure	2	2	2	0	6	14	4	12	
11. Evaluation	6	1	4	0	11	25	10	30	
12. Performance dip	3	0	3	2	8	18	6	18	
13. Leadership	10	4	8	5	27	61	18	55	
In general	2	2	3	1	8	18	5	15	
Characteristics and behavior	7	2	4	1	14	32	11	33	
Leaders' advocacy of organizational vision	5	2	5	2	14	32	10	30	

*The table shows the 13 categories of features of successful curricular change that the authors found in the literature. The **bolded categories** are those that predominate in the literature and that may be the most essential for successful curricular change.

that they did not view it as particularly remarkable and therefore did not write about it. Indeed, change efforts lacking an identified need for change would have “died on the vine” long before reaching the point of being reported on.

With these caveats, let us now take a closer look at the six feature categories that predominate in the curricular change literature.

Most striking is the heavy emphasis on the influence of the leader(s) and his or her leadership approach on the degree of success of a curricular change effort. One likely reason for this is the fact that the leader (usually the dean, a senior faculty member with the sponsorship of the dean, or a team of faculty representing the dean and senior faculty) is very influential in assuring the presence of the other essential features for successful change represented in categories of cooperative climate, participation by organization members, evaluation, and training related to the new curriculum. On the other hand, by neglecting these categories, the leader can inhibit successful curricular change. Clearly, the leader(s) of the organization must purposefully attend to the six essential categories we have identified in order for curricular change to successfully occur and be sustained. The following briefly describes the leadership role in conjunction with each of the other most frequently mentioned categories of features.

Leadership and cooperative climate. The maintenance of an academic culture and a positive climate are important to a medical school, not just for curricular change but also for optimal research productivity, creativity and innovation, faculty morale, and more. With regard to curricular change, a leader can promote a cooperative organizational climate by establishing the means and opportunities for faculty and department leaders from different disciplines to interact, nipping in the bud any “bashing” of certain disciplines, stepping in early to resolve turf conflicts, and modeling and expressing the education values expected of people in the organization, such as high regard for excellence in teaching and respect for education research.

Leadership and participation by organization members. Leaders must also assure that there is *real* participative governance in the organization. This requires more than a willingness to listen to others and have an open door; it requires that one set up formal mechanisms for faculty to participate and then that one “nudge” faculty to do so. Such formal mechanisms could include establishing a faculty advisory committee that meets weekly with the dean, setting up monthly meetings with the school senators, or urging individuals to serve on select school committees, such as an educational policy committee. Even these measures may be insufficient if faculty fail to take advantage of them or if only

a select few avail themselves of the opportunities presented. If this is the case, the leader will need to find additional ways to encourage meaningful and representative faculty participation. Methods of eliciting faculty participation may include recruiting especially influential faculty members to serve on committees, making it clear that the input of committees will greatly influence major decisions, and honoring those who serve on committees with awards or recognition.

Leadership and evaluation. One of the primary purposes of evaluation is to collect information for decision making. The leader must identify what information, important for upcoming decisions, is to be gathered through an evaluation. Thus, the leader works closely with the evaluator to assure that useful and timely data are collected. Another purpose of evaluation is to provide a description of the project's process and outcomes. As each individual's perception of the change process is unique, the variety of realities at play serve to complicate the task of discerning a clear picture of the change process. Having an objective description of the curriculum and curricular outcomes before the change (e.g., students' satisfaction, competencies acquired, faculty effort), as well as periodically during the change, provides a common understanding for discussions and decisions.

As noted in our review, medical schools find evaluation not only a useful tool but also a means to raise the value of curriculum work by framing the project as applied education research and presenting the evaluation data as research outcomes. The development of an evaluation design that addresses both research integrity and decision-making utility is, therefore, one of the issues that needs to be determined in the planning stage. Recognition of this tension between the need for generalizable data and data for more immediate decision making is important. It is important because having "real" data about the process and outcomes of the curriculum project will serve the leader in maintaining momentum and allocating resources for sustainability. As a consequence, it is necessary to have a clear, objective description at the beginning of a project and yet not to be too rigid early on about the outcomes to be measured. As Hembroff and colleagues point out, "When evaluators are brought in (as most of us think they should be) prior to actual program implementation, and where the goals for the program are many and are as yet untempered by the realities of actual implementation, evaluation flexibility is necessary so that the final evaluation strategy takes into account the inevitable goals clarification of the program as carried out."⁴⁹,p.338

To benefit from the clarification of goals that comes through evaluation, those implementing and those evaluating change need to ensure that both the focus and the methods of evaluation allow for a clear and useful picture of the evolving process and outcomes. By comparing the initial vision and goals with the final vision, it may be possible to

obtain a more accurate image of the change process that works within an individual institution and, as a consequence, increase the probability of success of future initiatives.

In addition to ongoing goal clarification, Hembroff and colleagues also suggest that changes in internal and external context can increase the need of flexibility in thinking about the evaluation process. This is consistent with the work of Glaser and others cited earlier. They observe that an institution implementing curricular change needs to have internal structures and procedures for monitoring the pulse of the community.¹ External events, due to their impacts on an institution or on the environment in which the institution exists, may necessitate adaptations to the curriculum initiative. These in turn will require revisions of the evaluation process to ensure that both the most accurate and the most useful information is collected.

Curricular innovations are by nature more lengthy than are other types of change, and the measurement of outcome success may span years. As a result, those in charge of implementation and institutionalization depend on accurate, timely, and practical information throughout the process to enhance present and future success.

Leadership and human resource development. Nearly all curriculum changes also require training for some or all of the faculty. For example, faculty will need new teaching skills and knowledge to successfully implement new instructional approaches, be they problem-based learning, Web-based instruction, or evidenced-based learning approaches. Sometimes, as described in our review, it is helpful for faculty to acquire these skills even before the curriculum is developed in order to reduce resistance and increase ownership. Developing the training programs and providing the faculty with release time to acquire new competencies requires the support of school leadership at all levels—from the dean to department heads to faculty leaders.

The second aspect of human resource development that is frequently mentioned is the importance of providing rewards and aligning rewards with curricular development and with implementing the new curriculum. Often this initially occurs with new resources from a foundation or government agency that allow faculty and departments to receive rewards for curricular-change work without changing the current reward structure. During the period that these time-limited resources are available, the leader(s) must calculate how to adjust ongoing revenue streams, policies, and assignments to continue to reward the curricular change effort after the start-up funds are depleted.

Methods of realigning internal funding allocations may include gradually shifting how central allocations are distributed to departments to match the effort needed for the new curriculum, adjusting the promotion structure to place a

higher value on curricular-change involvement, or changing the appointment system to incorporate new roles within the ranks of the faculty. Such new roles may include adding facilitators for a problem-based learning curriculum or adding community preceptors when the new curriculum involves a significant shift from hospital-based to outpatient-based teaching. Without this realignment of resources and rewards, the new curriculum will not survive, and often the old curriculum will reemerge, perhaps under the guise of the new name.

Leadership and politics. There is a good reason for the old saying, "It is easier to move a graveyard than change a curriculum," for changing a curriculum is a highly political process. It is the leader(s) who must successfully traverse the internal and external political terrain while others are working on the substance of the curricular change. Internally, the leader(s) must successfully "sell" the new approach and use his or her knowledge of both the formal and the informal power structures to build shared ownership of the new curriculum and head off turf battles as the control of major curriculum pieces shifts to match the new initiative. Working closely with a strong medical school senate and educational policy committee can be an effective mechanism for building shared ownership among the faculty. However, sometimes it is necessary to work around the existing governance structures and establish a new task force, committee, or board to direct the development and implementation of the new curriculum.

The W. K. Kellogg Foundation Curriculum Initiative was a creative venture that worked outside existing structures. This initiative succeeded in its efforts by establishing a board made up of both academics (e.g., the dean, key faculty) and community members interested in the outcomes of the new curriculum. The board not only directed the curricular change but also controlled foundation resources to support the change. This strategy proved very effective for developing and implementing a curriculum that crossed boundaries that had previously been difficult to span—across departments, between schools, and between schools and the larger community. Certainly access to additional funds was part of the reason for the success of this approach. However, it was also effective because the board structure provided a mechanism for people from different parts of the institution and the community to talk and interact, with their common goal being to improve the curriculum. Including community members not only increased the richness of the interaction but also forced the academics to address, explain, and often abandon their old turf-conscious attitudes.

External politics involves working with outside constituencies who have an interest in the school and can have an effect on the curriculum. State legislatures or foundations, for example, may provide funding for the school; and health

maintenance organizations (HMOs), hospitals, communities, or individuals seek out the services of the school's graduates. Here again, the leader(s) is critical. The leader represents the school in interactions with external audiences, and he or she must be vigilant in incorporating the interests of these constituencies into the new curriculum. To assure a continuing meaningful link with outside constituencies, some schools have established external advisory groups who represent the primary external constituencies. Advisory groups are valued not only for their advice about curricular change but also for their suggestions related to new research initiatives, building projects, and possible funding sources.

Some curricular innovations require interactions with state leaders, especially if the scope or magnitude of the innovation calls for significant state funding. Likewise, if the innovation necessitates a change in a state policy (for example, securing funding for the initiative by taxing HMOs), or involves a change in the state's licensure laws (for example, awarding prescription privileges to nurse practitioners), state officials will be involved. In these circumstances, the leader(s) must decide how to present the proposed plan to the various parties involved, employing the appropriate balance of direct and indirect communication strategies. The leader might choose to work with the institution's legislative action group, to make direct and parallel contact with legislators or other public officials, to mobilize grass-roots organizations, such as alumni and specialty associations, and/or to appeal to the general public through the media.

Concluding remarks about leadership. In short, leadership comes up again and again as critical to the success of curricular change because the leaders control or substantially influence nearly all the other features essential for success. They also directly provide one last feature of success that was one of the most frequently mentioned characteristics of successful change identified in the literature, that is, articulating and advocating an organizational vision. Nearly every article about change identifies the importance of visionary leadership, such that a reader is tempted to glaze over and skip such sections, saying to one's self, "Yeah, I know this, I know this." But knowing one *should* do this and knowing *how* to do it are two different things. Fortunately, there are some excellent books that provide concrete guidance on how to build a shared vision and keep it visible. For example, *The Fifth Discipline Fieldbook* takes Peter Senge's organizational philosophy about a "learning organization" and provides practical guidance and concrete examples for building a shared vision.⁵⁰ *Success in Sight: Visioning*, by Kakabadse et al., provides a highly readable text by balancing research on the need and the process for visioning with concrete steps for achieving a shared vision.⁵¹ And of course, *Built to Last*, by Collins and Porras, provides evidence of the essential role a visionary leader plays in organizations that endure, featur-

ing excellent examples of useful visions and how to build them.⁵²

While knowing how to build a shared vision is essential, this skill in itself is not sufficient for successful, enduring curricular change. The leader must specifically apply his or her visioning know-how to the desired educational or curricular change effort(s) that are part of the future picture of the school. For example, the vision of the institution might include specific reference to problem-based learning or bimodal efforts in research and primary care. If an educational element is missing from the institutional vision, while other goals, such as increasing the school's research status and productivity, are well-articulated and shared, the institutional vision will hamper rather than support curricular-change efforts.

FINAL THOUGHTS

In this review we have distilled those characteristics that are most commonly identified in the literature as affecting the success of curricular change. Another finding from this literature review is that there is a dearth of well-done research articles on this topic. Certainly, this is a very difficult and costly area in which to conduct rigorous research, but it is much more costly to invest in a curricular change only to have it fail entirely or survive only briefly. It is encouraging that recent studies of the process of implementing curricular change in medical schools provide rich insight into the real-life application of change strategies. This increasing literature base will likely provide a springboard for even further refinement of the change strategies that are best suited for medical school settings. Hopefully, these studies will also convince external funders and internal decision makers of the value of investing in research on curricular change.

This work was supported by the W. K. Kellogg Foundation's Community Partnerships for Health Professions Education Program.

REFERENCES

1. Glaser, EM, Abelson HH, Garrison KN. *Putting Knowledge to Use: Facilitating the Diffusion of Knowledge and the Implementation of Planned Change*. San Francisco, CA: Jossey-Bass, 1983.
2. Fullan M, Stiegelbauer S. *The New Meaning of Educational Change*. New York: Teachers College Press, 1991.
3. Lewin K. *Field Theory in Social Science*. New York: Harper and Brothers, 1951.
4. Lewin K. Group decisions and social change. In: Newcomb TM, Hartley EL (eds). *Readings in Social Psychology*. New York: Henry Holt, 1958:330-44.
5. Levine A. *Why Innovation Fails*. Albany, NY: State University of New York Press, 1980.
6. Fullan M. Change process and strategies at the local level. *The Elementary School Journal*. 1985;84:391-420.
7. Humphreys D. *General Education and American Commitments: A National Report on Diversity Courses and Requirements*. Washington, DC: American Association of Colleges and Universities, 1997.
8. Rogers E. *Diffusion of Innovations*. New York: Free Press, 1995.
9. Rollins LK, Lynch DC, Owen JA, Shipengrover JA. Moving from policy to practice in curriculum change at the University of Virginia School of Medicine, East Carolina University School of Medicine, and SUNY-Buffalo School of Medicine. *Acad Med*. 1999;74(1 suppl): S104-S111.
10. Brooks WB, Orgren R, Wallace AG. Institutional change: embracing the initiative to train more generalists. *Acad Med*. 1999;74(1 suppl): S3-S8.
11. Bussigel M, Barzanksy BM, Grenholm GG. *Innovation Processes in Medical Education*. New York: Praeger Publications, 1987.
12. Krackov S, Mennin S. A story of change. *Acad Med*. 1998;73(9 suppl): S1-S3.
13. Louis K. Organizational change. In: Alkin MC (ed). *Encyclopedia of Educational Research*. New York: MacMillan, Maxwell MacMillan International, 1992:941-7.
14. Ross RH, Fineberg HV. *Innovators in Physician Education: The Process and Pattern of Reform in North American Medical Schools*. New York: Springer Publishing, 1996.
15. Corbett HD, Dawson J, Firestone W. *School Context and School Change: Implications for Effective Planning*. New York: Teachers College Press, 1984.
16. Miles M, Louis K. Research on institutionalization: a reflective review. In: Miles M, Ekholm M, Vandenberghe R (eds). *Lasting School Improvement: Exploring the Process of Institutionalization*. Leuven, Belgium: ACCO (Academic Publishing Company), 1987.
17. Lasswell HD. *Politics: Who Gets What, When, How*. New York: McGraw-Hill, 1936.
18. Lippitt G, Langseth P, Mossop J. *Implementing Organizational Change*. San Francisco, CA: Jossey-Bass, 1985.
19. Lindberg MA. The process of change: stories of the journey. *Acad Med*. 1998;73(9 suppl):S4-S10.
20. Grayson MS, Newton DA, Klein M, Irons T. Promoting institutional change to encourage primary care: experience at New York Medical College and East Carolina University of Medicine. *Acad Med*. 1999;74(1 suppl):S9-S15.
21. Kaufman A. Leadership and governance. *Acad Med*. 1998;73(9 suppl): S11-S15.
22. Kantrowitz M, Kaufman A, Mennin S, Fulop T, Guilbert J. *Innovative Tracks at Established Institutions for the Education of Health Personnel*. Geneva, Switzerland: World Health Organization, 1987.
23. Morse RM, Plungas GS, Duke D, et al. The Virginia Generalist Initiative: lessons learned in a statewide consortium. *Acad Med*. 1999;74(1 suppl):S24-S29.
24. Rosenblum K, Louis K. *Stability and Change: Innovation in an Educational Context*. New York: Plenum, 1981.
25. Richards RW (ed). *Building Partnerships: Educating Health Professionals for the Communities They Serve*. San Francisco, CA: Jossey-Bass, 1996.
26. Kanter RM. *The Change Masters: Innovation for Productivity in the American Corporation*. New York: Simon & Shuster, 1983.
27. Firestone W, Corbett H. Planned organizational change. In: Boyan N (ed). *Handbook of Research on Educational Administration*. New York: Longman, 1988:321-40.
28. Louis K, Miles M. *Improving the Urban High School: What Works and Why*. New York: Teachers College Press, 1990.
29. Cohen J, Dannefer EF, Seidel HM, et al. Medical education change: a detailed study of six medical schools. *Med Educ*. 1994;28:350-60.
30. Hendricson WD, Payer AF, Rogers LP, Markus JF. The medical school curriculum committee revisited. *Acad Med*. 1993;68:183-9.

31. Crandall D, Eiseman J, Louis K. Strategic planning issues that bear on the success of school improvement efforts. *Education Administration Quarterly*. 1986;22:21-49.
32. Matson CC, Ullian JA, Boisaubin EV. Integrating early clinical experience curricula at two medical schools: lessons learned from The Robert Wood Johnson Foundation's Generalist Physician Initiative. *Acad Med*. 1999;74(1 suppl):S53-S58.
33. Eastwood KW, Louis KS. Restructuring that lasts: managing the performance dip. *Journal of School Leadership*. 1992;2:212-24.
34. Colwill J, Perkoff GT, Blake RL, Paden C, Beachler M. Modifying the culture of medical education: the first three years of the RWJ Generalist Physician Initiative. *Acad Med*. 1997;72:745-53.
35. Stark JS, Lattuca LR. *Shaping the College Curriculum: Academic Plans in Action*. Boston, MA: Allyn and Bacon, 1997.
36. Little JW. Norms of collegiality and experimentation: conditions for school success. *American Educational Research Journal*. 1982;19:325-40.
37. Bland CJ, Ruffin MT IV. Characteristics of a productive research environment: literature review. *Acad Med*. 1992;67:385-97.
38. Peters TJ, Waterman RJ Jr. In *Search of Excellence: Lessons from America's Best-run Companies*. New York: Harper & Row, 1982.
39. Pelz DC, Andrews FM. *Scientists in Organizations: Productive Climates for Research and Development*. New York: John Wiley & Sons, 1966.
40. Mennin S, Krackov SK. Reflections on relevance, resistance, and reform in medical education. *Acad Med*. 1998;73(9 suppl):S60-S64.
41. Dannefer EF, Johnston MA, Krackov SK. Communication and the process of educational change. *Acad Med*. 1998;73(9 suppl):S16-S23.
42. Ross LL, Appel MH, Kelliher GJ. The role of the Generalist Physician Initiative in the merger of Hahnemann University and the Medical College of Pennsylvania. *Acad Med*. 1999;74(1 suppl):S16-S23.
43. Bolman LG, Deal T. *Reframing Organizations*. San Francisco, CA: Jossey-Bass, 1991.
44. Joyce BR, Showers B. *Student Achievement Through Staff Development*. New York: Longman, 1988.
45. Rubeck RF, Witzke DB. Faculty development: a field of dreams. *Acad Med*. 1998;73:S32-S37.
46. Gerrity MS, Mahaffy J. Evaluating change in medical school curricula: how did we know where we were going? *Acad Med*. 1998;73(9 suppl):S55-S59.
47. Henry RC. Evaluation as a tool for reform. In: Richards RW (ed). *Building Partnerships: Educating Health Professionals for the Communities They Serve*. San Francisco, CA: Jossey-Bass, 1996:143-55.
48. Bland CJ, Starnaman SM, Hembroff L, Perlstadt H, Henry RC, Richards RW. Leadership behaviors for successful university-community collaborations to change curricula. *Acad Med*. 1999;74:1227-37.
49. Hembroff L, Perlstadt H, Henry RC, et al. When (not if) evaluation flexibility is desirable. *Eval Health Prof*. 1999;22:325-41.
50. Senge PM, Kleiner A, Roberts C, Ross RB, Smith BJ. *The Fifth Discipline Fieldbook: Strategies and Tools for Building a Learning Organization*. New York: Doubleday, 1994.
51. Kakabadse A, Nortier F, Abramovici NB. *Success in Sight: Visioning*. London, U.K.: International Thomson Publishing, 1998.
52. Collins JC, Porras JI. *Built To Last: Successful Habits of Visionary Companies*. New York: HarperCollins, 1994 [paperback 1997].