DOCUMENT RESUME

ED 426 744 JC 990 075

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TITLE	What Educational Administrators Need To Know about Information and Information Systems: A User's Point of View.
PUB DATE	1998-08-00
NOTE	24p.
PUB TYPE	Opinion Papers (120) -- Reports - Descriptive (141)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Access to Information; Administrators; College Administration; Community Colleges; *Educational Environment; Higher Education; *Information Systems; *Organizational Climate

ABSTRACT

This paper examines what educational administrators need to know about information systems in order to be effective within a system of higher education, particularly a community college, environment. The first section provides a general overview of the nature and role of information in contemporary organizations. The second section focuses on the role of information in higher education environments. Also examined in this section are the characteristics and distinct informational needs of four academic cultural types: collegial, managerial, developmental, and negotiating. Regardless of their cultural type, all institutions will need to realign their structures in response to the demands of the information age, the need for individualized learning, the mandate for lifelong learning, and the need for high-quality and flexible enabling services. The paper concludes with a list of 27 recommendations for managing information in an educational setting, drawn from the author's experience at a community college whose primary academic culture was developmental. Contains 17 references. (SJL)

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WHAT EDUCATIONAL ADMINISTRATORS NEED TO KNOW ABOUT INFORMATION AND INFORMATION SYSTEMS: A USER'S POINT OF VIEW

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August 14, 1998

JC 990075

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INTRODUCTION

The purpose of this paper is to examine what an educational administrator needs to know about information systems in order to be effective within a college organization or system of higher education. The first part of this paper will provide an overview of the nature and role of information within today's organizations. The second part will focus on the role of information and information systems within higher education. Finally, examples will be included from my experience as a community college dean of instruction whose responsibilities include oversight for matriculation, institutional research, catalog and schedule production, and program review. All four areas require me to work closely with data and information systems.

INFORMATION AND INFORMATION SYSTEMS -- AN OVERVIEW

> Data isn't information, any more than fifty tons of cement is a skyscraper. . . . Most important, information is not knowledge. . . . Our networks are awash in data. A little of it's information. A smidgen of this shows up as knowledge. Combined with ideas, some of that is actually useful. Mix in experience, context, compassion, discipline, humor, tolerance, and humility, and perhaps knowledge becomes wisdom. (Stoll, 1995, p. 193)

Say goodbye to the Industrial Age with its precise divisions of labor, its assembly line mentality, its reductionist approach to problem solving. Say hello to the Information Age, a

phrase that has become commonplace as business, industry, government, and education attempt to explain the revolution that is occurring within the workplace.

> This revolution is evidenced by the rapidly changing distribution of the work force in the United States. In 1920, 9 percent of the work force was engaged in knowledge and educational services; in 1955, 29 percent; and in 1975, 50 percent. In 2000, it is estimated that 66 percent of the work force will be involved in such services. (Bass, 1990, p. 881)

It is a revolution that is changing our most fundamental concepts of the nature of work, the worker, and the kind of management and leadership that are necessary to support an information-based workplace.

Among the explanations for the shift from an industrial to an information model is Drucker's (1995, p. 76) proposition that the shift to a knowledge[1] society in the United States was the result primarily of the passage of the GI Bill of Rights after World War II. There was an unprecedented response to the educational opportunities provided by the bill, an influx of students whose sheer numbers and diversity had significant and long-term impact on the country's higher education system, as well as the work place. There were other causes, as well, most notably the shift from forced technology to high tech/high-touch technology, the shift from a national to a global economy, and the shift from the models and metaphors of physics to those of biology (Naisbett, 1990).

But what exactly is meant by *information* in this context and what makes it different from any other resource? According to the dictionary, *information* applies to facts or data that are gathered in any number of ways, but does not necessarily connote validity. It may be helpful to

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[1] "Knowledge" and "information" are frequently used as synonyms. However, a distinction can be drawn between the two. See p. 3.

state what information is not. *Information* is not *knowledge*, which implies some level of understanding, and it is not *wisdom*, which implies superior judgment (Guralink, 1980). Cleveland (in Bass, 1990, p. 881) identifies six properties of information:

1. Information is expandable. Only time and capacity of people limit its growth. According to Wheatley, "information is unique as a resource because of its capacity to generate itself" (Wheatley, 1992, p. 105).
2. Information is compressible. It requires little energy and the depletion of few physical resources. A single CD ROM can easily contain an entire encyclopedia of information, plus the programming necessary to access it.
3. Information can replace land, labor, and capital. As Drucker notes, however, information does not really replace these traditional economic factors. Rather, it makes them secondary (Drucker, 1995, p. 76).
4. Information is transportable. Information can be transported electronically or carried in a 3-1/2" diskette. It can be duplicated, replicated, and manipulated by nearly anyone with access to increasingly available and affordable equipment. Even more basic, however, is the fact that specialized information is really "capital" which "belongs to the employee and not to the organization. . . . These forms of capital belong to the employee and are carried by her to her next job" (Bergquist, 1993, p. 154).
5. Information is diffusive. It leaks. In some contexts, the fact that information leaks can be damaging, even fatal. However, for a system or organization to remain vital and alive, information, both external and internal, must be accessible. "This is very different from the more traditional organization response to information" (Wheatley, 1992, pp. 91).

6. Information is shareable. According to Bennis, sharing information is an essential characteristic of great groups, – creative alliances of individuals who together, are able to achieve more than any single member could by him- or herself (Bennis, 1997, p. 3).

Expandable, compressible, replaceable, transportable, diffuse, shareable. These terms are all action words. Indeed, according to Wheatley, one of the heretofore unrecognized characteristics of information is its dynamic nature.

> What we were all suffering from, then and now, is a fundamental misperception of information: what it is , how it works , and what we might expect from it. The nub of the problem is that we've treated information as a "thing," as an inert entity to disseminate. . . . This "thing" view of information arose from several decades of information theory that treated information as a quantity, as "bits" to be transmitted and received. Information was a commodity to transfer from one place to another. The content, meaning, and purpose of information were ignored; they were not part of the theoretical construct. . . . I believe it is information theory that has gotten us into trouble. We don't understand information at all. . . . We expected information to be controllable, stable, and useful for our purposes. We expected to be able to manage it. (Wheatley, 1992, pp. 101-102)

New theories about systems and order do not view information as a commodity. It is considered to be "both the underlying structure and the dynamic process that ensure life" (Wheatley, 1992, p. 102). Wheatley is perhaps the most eloquent of the systems theorists on this point. While information may be an outcome, it is also a cause. As information changes, so should the system. If the system does not change in response to new information, or "if the information...merely confirms what is, then the result will be death. Isolated systems wind down and decay, victims of the law of entropy" (Wheatley, 1992, pp. 104-105). Thus, the effectiveness of an organization is determined by how well it transmits, verifies, and uses data (Cunningham, 1993, p. 146).

Wheatley proposes that if information is the fundamental ingredient of the process by which structures and systems are created, it can only serve this purpose if organizations are themselves living entities with the same dynamics as open systems. "A key question, then, is are organizations alive? Are they conscious, responsive entities?" (Wheatley, 1992, p. 106) Wheatley defines consciousness as the capacity to deal with information, to communicate, and reasons that anything capable of organizing itself possesses some level of consciousness. Thus, she concludes that organizations qualify as conscious entities for whom the continual genesis and communication of information are vital to their health. It becomes impossible to discuss organizations without acknowledging the central function of information. "There is an implicit relationship between information, understanding, work culture, and the quality (or excellence) of the output" (Cunningham, 1993, p. 146).

From this perspective, it is easy to understand why the management of information is such an important consideration. Or, as Wheatley would say, "Information is managing us" (Wheatley, 1992, p. 104). Whichever is more accurate, the ways in which organizations value information, communicate it, and use it are critical to their well being. Managing information – or being managed by it – pose some significant challenges.

First, there must be a shift in attitude toward information. It is still true that information is power, but it is no longer true that controlling information is in the best interests of the organization. "In fact, the greatest generator of information is chaos. . . .Of course, this is exactly what we fear. Our management task is to enforce control, to keep information contained, to pass it down in such a way that no procreation occurs. Information chastity belts are a central management function" (Wheatley, 1992, p. 105).

Second, information must be collected, measured, and disseminated. To be sure, there are considerable technical challenges to creating and maintaining an effective information system. Technology has, of course, made the Information Age possible. However, technology is extremely dynamic and can be expensive both to acquire and maintain. But as Pinchot and Pinchot (1994, p. 89) note, "Creating a system open to a free flow of information and ideas is not primarily a technical challenge; it is a political one." What information is collected, when and where it is disseminated, and most importantly, by and to whom, are powerful decisions and in fact often tend to drive decisions about technology rather than the other way around.

There is another important aspect to the dissemination and application of information. Once applied, the effects of the information may not be known for a very long time. As Cunningham notes, "Improvements are usually gradual, incremental, and long-term and systems of measurement must be able to pick up this gradual improvement" (Cunningham, 1993. p. 46). If members of the organization are not kept apprised of the progress, if there is sporadic or no follow-up, there is no sense that the endeavor was worthwhile and no way to learn anything new from the outcomes.

Third, managing the volume and flow of information is challenging. It often seems that with information, it is either feast or famine. There is either not enough reliable information for decision making or there is far more than can be handled.

> Here we sit in the Information Age, besieged by more information than any mind can handle, trying to make sense of the complexity that continues to grow around us. Is information anything more than a new and perplexing management tool? . . . In organizations, we aren't suffering from information overload just because of technology, and we won't get out from under our information dilemmas just by using more sophisticated information-sorting techniques. . . . However long we may drag our feet, we will be forced to accept that information – freely generated and freely exchanged, -- is our only hope for organization. (Wheatley, 1992, p. 145)

Of the two predicaments, it is probably preferable to have more information than not enough. As Wheatley notes, "no one knows what information an individual will choose to notice" (1996, p. 82). Limited information restricts people's capacity to discover something new. The caveat is, of course, that the information that is available needs to be reliable and relevant. Otherwise, the danger exists that we "limit our explorations of what's possible by surrounding ourselves with large amounts of information that tell us nothing new" (Wheatley, 1996, p. 26). Another caveat is that information has a very short shelf life.

> Today, the time span for useful information is considerably shorter than that of human life, and , therefore, individuals must constantly prepare to stay informed. Half of all the information available at any point in time will become obsolete within 10 years. (Cunningham, 1993, p. 48)

Finally, it is the central challenge of any organization to ensure that its members not only have access to information, but be able to make use of it. "You might even say that knowledge not acted upon is worthless" (Pinchot, 1994, p. 85). Workers need general knowledge, but general knowledge alone is not enough. As Drucker has observed, it is really a question of multiple knowledges which exist only in application and therefore are by definition highly specialized forms of knowledge. Such specialized knowledge can only be obtained through education, which "will become the center of the knowledge society and schooling its key institution" (Drucker, 1995, p. 234). In fact, the definition of an educated person will change from the traditional concept of a person who has acquired a prescribed body of knowledge to "somebody who has learned how to learn and who throughout his or her lifetime continues learning, and especially learning in and through formal education" (Drucker, 1995, p. 235).

Organizations dependent upon specialists have the need to ensure that systems are in place to encourage and facilitate communication among specialists, for as Drucker notes,

"By itself, specialized knowledge yields no performance. In the knowledge society it is not the individual who performs. The individual is a cost center rather than a performance center. It is the organization that performs" (Drucker, 1995, p. 242). The challenge lies in both acknowledging the need for specialization yet organizing in such a way that collaboration across the specialties or disciplines is possible.

> As large organizations enter the information age, a similar transition is taking placed in the way they are structured. A business enters the information age when the interconnections needed overwhelm any conceivable bureaucratic structure. Knowledge workers create this situation, because to use their brains effectively they have to cross boundaries and freely collaborate. However the organization is divided, huge volumes of collaboration are needed across the divisions.
>
> As successes in interdepartmental cooperation grow, we will discover that in a systems thinking age, the bulk of opportunities lie not within single departments but in the interaction between departments. Organization by department underexploits anything that falls between. (Pinchot, 1994, pp. 112-113)

The ability to work across disciplines is essential since knowledge workers who are specialists must be able to work in teams. The organization has a responsibility to provide its employees with the skills required for effective collaboration. Employees "must learn – and learn early – how to assimilate into their own work specialized knowledges from other areas and other disciplines" (Drucker, 1995, p. 239).

There are some special challenges for learning organizations in respect to information and knowledge. First, as noted above, employees need to learn how to work across the disciplines. This is not easily accomplished in colleges traditionally organized by disciplines. Second, employees own the knowledge, the capital. When they leave, their information and knowledge go with them. This means that organizations are exceptionally reliant upon individual employees and may find that there is a very competitive market for their services.

"Thus, the only power many leaders of postmodern organizations hold over their key employees is psychological (rather than economic or positional) in nature" (Bergquist, 1993, p. 154).

Keeping in mind that information is power, Drucker warns of a third challenge, -- the generation of a new kind of class conflict: "the conflict between the large minority of knowledge workers and the majority of people who will make their living the traditional ways" (Drucker, 1995, p. 235). While Drucker does not see knowledge workers as the *ruling* class of the knowledge society, he does see them as the *leading* class. Related to the possibility of class conflict is the challenge of productivity. "The productivity of knowledge work – still abysmally low – will predictably become the *economic* challenge of the knowledge society. The productivity of the non-knowledge-services work will increasingly become the *social* challenge of the knowledge society (Drucker, 1995, p. 236).

Fourth, it is not enough to give people access to information. They must have the freedom to act upon it. Thus, organizations must decentralize decision making and empower employees to make changes based on the data available to them. To create and maintain such an environment becomes the particular challenge for management. The second part of this paper will examine what the manager or administrator within higher education must consider in relation to information systems.

INFORMATION SYSTEMS AND HIGHER EDUCATION

> Because the knowledge society perforce has to be a society of organizations, its central and distinctive organ is management. . . . Management as a *practice* is very old. But as a *discipline*, management is barely fifty years old. . . . The essence of management is to make knowledges productive. ... Management, in other words, is a social function. And in its practice, management is truly a "liberal art." (Drucker, 1995, pp. 249-250)

Higher education has a dual interest in the subject of information systems. Given the need to develop lifelong learning skills among highly specialized workers, colleges and universities will need to be able to provide relevant and accessible training not only in the technical skills required for information management systems, but also in workplace skills such as collaboration, team building, and communication. Colleges and universities are also organizations themselves and highly complex ones. Although culturally different from corporations, their need for information and information systems is no less than that of corporations.

> Universities contrast greatly with mainline utilitarian organizations and have been described as organized anarchies...universities are likely to have problematic goals, unclear technologies, and fluid participation in decision making. Inertia is high in universities. Most issues are of little consequence to the members as a whole, and decisions depend on who happens to be involved at the time they have to be made. There is a weak base of information available. Effective leadership requires managing unobtrusively, providing arenas for discussing a wide variety of problems, facilitating the participation of opposing points of view, and persisting in attempts to accomplish objectives despite the inertia. (Bass, 1990, p. 577)

In The Four Cultures of the Academy, Bergquist (1992) identifies four different academic cultures: the collegial, the managerial, the negotiating, and the developmental. **The collegial culture** is a culture that finds meaning primarily in the disciplines represented by the faculty in the institutions. **The managerial culture** is a culture that finds meaning primarily in the organization, implementation, and evaluation of work that is directed toward specified goals and purposes. **The developmental culture** is a culture that finds meaning primarily in the creation of programs and activities furthering the personal and professional growth of all members of the collegiate community. **The negotiating culture** is a culture that finds meaning primarily in the establishment of equitable and egalitarian policies and procedures for the distribution of resources and benefits to the institution.

All four cultures exist simultaneously and interdependently, according to Bergquist, but one is usually predominant. The need for information exists for all four cultures, but especially for the managerial and developmental.

> The management of information is a critical ingredient in all contemporary organizations, but it takes on special importance and meaning in the managerial culture. Information is not only needed to make a thoughtful decision; it is also required if one is to receive much attention from peers and superiors If managers are not in control of the facts, they will not be heard. Data – not charisma – seems to play a critical part in this culture. Institutional research has become increasingly important in many colleges and universities for this very reason. The administrator or faculty member who has received and can understand budget reports, student attrition figures, and employment projections commands more respect than the administrator or faculty member who has no access to this information or does not understand it. (Bergquist, 1992, p. 84)

In a developmental culture, developmentalists insist that all members have access to the maximum amount of information.

> Information is inherently valuable to individuals and organizations, according to the developmentalists. They believe that only through the introduction of new information that somehow calls into question an individual's or organization's current self perceptions will "unfreezing" take place, as a precondition to real learning and change. Information is similarly required to preserve authenticity in relationship. . . . Information about one's own behavior, according to the developmentalists, is essential if one is to continue to mature and become more successful in organizational settings. (Bergquist, 1992, p. 116)

If we accept Bergquist's model as an accurate description of the academic environment, it is clear that in the area of information and information systems, educational managers must first be cognizant of their own institution's culture in order to determine how they can be most effective in managing information. In a developmental culture, it is critical to ensure that information is accessible to all members at all times. It may or may not be critical that the manager have a thorough understanding of the data. In a managerial culture, it is not only

important that information is available, it is also important that the manager demonstrate understanding and control. Otherwise, his or her effectiveness is greatly diminished.

The educational manager's task is further complicated by the fact that the information available in most colleges and universities is, as Bass observes, "weak," and the technology to support it is "unclear." It is not that colleges do not collect data; most have extensive data bases that contain years of data about students, finances, curriculum, and personnel. What colleges frequently lack, however, are the resources to retrieve data, disseminate it in an accessible form, and analyze it systematically. These resources include money. Technology is expensive to purchase and expensive to maintain. The fact that it changes so rapidly means organizations have to commit scarce and unpredictable resources to regular upgrades. Another scarce resource is personnel. Specialists in this highly competitive field command high salaries, usually well beyond what the average college's pay scale allows. Ironically, this is a particular problem for colleges located in high tech areas such as Silicon Valley.

> Knowledge, in addition to being highly portable, is not easily controlled by those who own and run organizations. Administrators and managers must rely on the information given to them by staff members and information specialists. They often have to compete with other organizations for these highly paid custodians of their organization's information. (Bergquist, 1993, p. 154)

Colleges usually try to handle in-house as many of their information management functions as possible, typically as a result of insufficient funds to outsource or as a result of the lack of a strategic technology and research plan. If they do outsource, they may not have the in-house expertise to work effectively with an outside vendor or to coordinate the activities of several vendors. Moreover, even if they have the programming and research support to access the information, colleges often lack the ability to link the data with their planning processes.

Colleges talk a great deal about the importance of data-based decision making, but relatively little occurs.

> For those campuses where [information technology] is an important issue, . . . planning how information technology will be used within the institution presents problems. Firs, it is unlikely that the campus will be able to rely on discipline-developed guidelines to tell it how to build its systems. In other words, this is not necessarily an academic problem. Second, the campus will need to develop much of its system in cooperation with external vendors. ...Third, the movement toward an integrated, campuswide information technology system is costly and will require a major shifting of resources or the development of new resources. (Rowley, 1997, p. 248)

In spite of the inadequacies inherent in most educational institutions' ability to manage information, colleges have entered a new era of accountability. The 90s could be referred to as the Age of Accountability, or at least the call for accountability. As Stark (1997) notes, "higher education evaluation and adjustment mechanisms have remained idiosyncratic and unsystematic." One example of increased expectations in this area is the substantial revision of accreditation standards for community colleges by the Western Association of Schools and Colleges. Colleges must be able to demonstrate not only the capacity for data collection and analysis but that they have actually used the information to improve programs and services in a cycle of continuous assessment and adjustment.

It is because of the power of external influences over higher education that the 1990s have been called "the time of troubles" (Kerr, 1994). As Stark (Stark & Lattuca, 1997) observed, it is society, not higher education itself who is the primary initiator of change. For the first time, higher education is mostly the reactive defender of the *status quo* rather than the joint initiator or at least a cooperative partner. Kerr (1994) explains that society is the aggressor for several reasons: (1) society has fewer new resources to spread around; (2) society has more claimants on those resources; (3) American society demands that higher education, as never

before, concentrate on support of the economy, engaged as it is in intensified international economic competitions. "The number one priority is now clearly being given to advancing human capability, with educational justice in second place, with lesser places (if any at all) to developmental growth, pure learning, or an evaluation (criticism) of society" (Kerr, 1994). Society in the 90s is demanding of higher education a reordering of priorities and a more efficient use of resources. As Drucker observes, ". . . education will become the center of the knowledge society and schooling its key institution. What knowledge is required for everybody? What mix of knowledges is required for everybody? What is "quality" in learning and teaching? All these will, of necessity, become central concerns of the knowledge society, and central political issues" (Drucker, 1995, p. 234). Schools will become of increasing concern to society as a whole. They will not be left to educators. The paradox, as Drucker points out, is that schools themselves may not necessarily become more important as a result. Education will need to happen throughout adults' lives and thus will probably be delivered through nontraditional methods.

> The colleges and universities we know today will not disappear. Rather, transformation will progress relentlessly as the information age advances, brining with it incremental change as it develops. . . . This change will be necessitated by the emergent information explosion. . . . The role of a professor will move from being the source of all knowledge to being the mentor, synthesizer, evaluator, and certifier of mastery. (Rowley, 1997, p. 310)

Educational managers will be responsible for ensuring that their institutions are able to provide the data and the analysis necessary to meet performance standards. As Stark notes, society has always emphasized accountability to some degree and in some manner, whether to justify funding or to assert quality control as a means of slowing and refocusing curricular change, that is to "correct" the course of the colleges (Stark & Lattuca, 1997, pp. 73-74).

Sources of demand for quality control mechanisms are varied. They include educators, society, and students, but most frequently they are those who provide funding to higher education: state and federal governments and to a lesser extent, private foundations and businesses (Stark & Lattuca, 1997, p. 73). In spite of longstanding expectations of accountability, higher education's mechanisms for evaluation and adjustment have remained "idiosyncratic and unsystematic" (Stark & Lattuca, 1997, p. 45).

> Although the public has increasingly sought quality control, colleges have only begun to develop procedures for evaluating whether the academic plans they devise full support excellence. Thus, the debate about quality control and accountability shows no sign of abating." (Stark & Lattuca, 1997, p. 78)

For California community colleges in the 1990s, the demand for accountability from so many external sources has resulted in an attempt to become more systematic about measuring effectiveness. In *Embracing the Tiger: The Effectiveness Debate and the Community College*, Roueche, Johnson and Roueche (1997) note that community colleges are more exposed than the four-year, "ivy-covered" institutions. They are even less able than four-year colleges and universities to ascribe the problem to poor public relations. The call for accountability has drawn a line in the sand with higher education on one side and the public on the other (Roueche, 1997, pp. 4-5).

In the 1980s, there were three major community college reform efforts in California. One occurred with the system-wide requirement to tighten academic standards for degree-applicable courses in order to ensure their rigor, especially in the area of critical thinking. The second was the result of the passage of Assembly Bill 1725, a major piece of legislation which made fundamental changes in community college governance. The third reform was Assembly Bill 3, which mandated the matriculation process, designed to ensure access and improve the success of community college students. One component of the matriculation legislation in particular has

significance for this discussion. Matriculation required that colleges establish research functions to evaluate student progress and to validate assessment instruments used for placement. It was an important change because it would give the community colleges the foundation upon which to build future attempts to measure institutional effectiveness. Unfortunately, the progress of 108 community colleges proved to be uneven and was exacerbated by similar problems at the state level of management information systems. It would not be until the late 1990s that there would be agreement on the key indicators, such as the transfer rate, and the formulas by which they would be measured.

Accreditation is another critical driver in community college reform, especially in respect to accountability. The Southern Association of Colleges and Schools was a pioneer in establishing the expectation that colleges would have in place the systems necessary to demonstrate institutional effectiveness. In 1997, the Western Association of Schools and Colleges (WASC) implemented new accreditation standards. The main change that appeared throughout every standard was the requirement that colleges not only have the systems in place to measure institutional effectiveness, but that those systems actually generate data which are used to improve programs and services. Thus, assessment and evaluation have become the cornerstones of institutional planning efforts. One result of the push toward accountability is a re-examination of the infrastructure of the community college system since many educators, O'Banion (O'Banion, 1997) for example, stress that no meaningful improvement in student outcomes and institutional effectiveness can occur without significant changes in the system itself.

What may have the most impact, however, is California's imminent approval of a performance based funding model for a portion (3%) of the state appropriation to community

colleges. Once signed by the governor, this legislation will require the system to show "reasonable" improvement in areas such as transfer rate and the granting of degrees and certificates. This is a major challenge for the system's 108 colleges. Although the legislature has agreed to accept system-wide data (vs. data by individual college), that still requires colleges to institute data collection and research activities at the most basic level – the classroom. Indeed, this will be the greatest challenge for educational managers. They must educate a faculty largely untrained in andragogical principles to conduct classroom based assessment, learn to analyze the results, and systematically adjust methodologies to improve performance – of their classroom their discipline, and finally, of the college as a whole.

In summary, educational administrators will need to realign their institutions with external changes and expectations. To do so will require a substantive understanding of:

- The demands of the information age
- The emergent needs for individualized learning
- The growing mandate for barrier-free, lifelong learning
- The evident need for high-quality and flexible enabling services. (Rowley, 1997, p. 309)

I have five years experience as a community college dean of instruction. My responsibilities include oversight for matriculation, institutional research, catalog and schedule production, and program review. All four areas require me to work closely with data and information systems. For example, in the area of matriculation, I was responsible for upgrading counselors' computer systems, designing and installing a local area network, selecting software, and computerizing functions within admissions, orientation, assessment, advising, training, and follow-up. Specifically, I worked on the team to implement a scannable application and

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telephone registration, an electronic educational plan, computerized placement testing, and a program to track counseling services for individual students. I set up training sessions and developed materials for counselors and staff. The catalog and schedule require a working knowledge of the curriculum data base, the course master file, and the process by which files are updated and rolled over to create a new schedule of classes. Program review, a process which I revamped several years ago, is now computerized and linked to the budgeting process. My greatest involvement with information, however, is in the area of institutional research, for which I have oversight. Much of my time has been spent as a member of the design team for a separate research data base and a query program that will provide faculty and staff with a user-friendly means of accessing data about programs and services.

I agree with all that the theorists have to say about managing information in an educational setting. I think it would be useful, however, to amplify that information with my experience. The culture at my community college is mostly developmental, following Bergquist's model. However, there is an expectation that management demonstrate the ability to understand and control, i.e., use, data. My primary goal throughout all these tasks is to create and nurture a research pervasive environment. My experience has taught me much, including (in no particular order):

1. Never assume the data are correct or complete.
2. Always double-check the totals down the columns and across the rows.
3. Never withhold information unless legally bound to do so.
4. Question everything and encourage your colleagues to do the same. "What if?" "Why not?" and "How come?" should be your mantra. ("Who says?" and "Prove it" can be included, but be careful with the tone and possibly the wording.)

5. Ask yourself, "Does this make sense?" Facts are the greatest enemy of truth (Cervantes?).
6. Embrace chaos. It is the source of new information.
7. Make sure you're asking the right question.
8. Don't rush to conclusions.
9. There is never one single cause for anything.
10. Don't bet.
11. Consider the information you don't have, not just that which you do have.
12. Always give people feedback within a reasonable amount of time, even if all you can say is "I don't know yet." Some results take a long time.
13. You don't have to know everything but you should know how to find out what you need to know.
14. Everything is connected. If you think you've considered all the ramifications, you haven't.
15. Sometimes you have to act without enough information. Just be clear that's what you're doing.
16. All the information in the world won't necessarily save you from making a bad decision.
17. Don't let a fellow educator tell you research is not his/her job.
18. You can't communicate enough.
19. Never assume you know who all the affected parties are.
20. Just when you think you can predict students' behavior, you can't.
21. Internal benchmarks by themselves are useless unless your goal is only to affirm what you're already doing.
22. There is no such thing as a dumb question – really.
23. Keep it simple.

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24. Stay one upgrade behind cutting edge. It's cheaper, more reliable and most users won't know the difference.

25. Listen.

26. When you're wrong, admit it.

27. Maintain a good working relationship with your programmers and the rest of your information systems staff. You need these people.

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