The OBSERVATORY
on borderless higher education

Report

Organise to Optimise:
organisational change & higher education

John Harris, Samford University
John Tagg, Palomar College
Mike Howell, Samford University

June 2005

John Harris is the Orlean Bullard Beeson Professor of Education and Director of Special Projects at Samford University, Birmingham, Alabama, U.S.A. He writes about and works in higher education accreditation, assessment, and quality improvement. [contact: jwharris@samford.edu]

John Tagg is Associate Professor of English at Palomar College in San Marcos, California, U.S.A. He is the author of *The Learning Paradigm College* (Anker, 2003) and many articles on higher education reform. [contact: jtagg@cox.net]

Mike Howell is Professor of Biology at Samford University in Birmingham, Alabama, U.S.A. He is the author of sixty peer-reviewed scientific articles dealing with evolutionary biology, cytogenetics, systematics and environmental hormone disrupters. [contact: wmhowell@samford.edu]

The Observatory
on borderless
higher education
John Foster House,
36 Gordon Square,
London WC1H 0PF
United Kingdom
Tel: +44 (0) 20 7380 6773
Fax: +44 (0) 20 7387 2655
www.obhe.ac.uk

The Observatory is a joint initiative between the Association of Commonwealth Universities and Universities UK

International Strategic Information Service

Organise to Optimise: organisational change and higher education

Abstract

Administrators and faculty in 'traditional' institutions are increasingly attempting to meet the growing, global demand for postsecondary competencies. There is growing pressure to maximise 'throughput'[1] while ensuring student learning outcomes. Can this be done by institutions organised as loosely connected disciplinary silos designed for elite, in-residence students and faculty research? We believe not. Horizontal, integrated systems are more capable of maximising throughput and ensuring consistent and quality outcomes. Yet, most colleges and universities are organised as weak bureaucracies composed of disciplinary silos. While horizontal systems can enhance consistent quality outcomes through an effective and efficient use of resources, they are optimised when they operate as organisms or complex adaptive systems[2]. Attempting to provide mass postsecondary education through institutions designed to resemble research universities handicaps the educational effort and diminishes the research university; neither is optimised. We suggest that postsecondary institutions organised horizontally are better positioned to optimise student learning than institutions composed of silos. But the optimising capabilities of organic systems are even greater than engineered horizontal systems. Therefore, we urge educators to explore how they might move toward organising postsecondary institutions as organic systems.

1 Introduction- The Challenge

Postsecondary education institutions across the world face unprecedented challenges to their success, and even their survival. Colleges and universities operate in a world of rapid technological change, dramatic global population growth, and urgent demands for life and work skills that are changing constantly. Change is not an incidental outcome of accidental causes but a permanent and growing feature of the world we live in. Can higher education institutions as presently organised on the model of research universities effectively function as national, mass, postsecondary systems? Almost certainly not. Institutions are already straining to meet the needs and expectations imposed upon them by the modern world; if present trends continue, they will fall ever further behind. The challenges are increasingly disproportionate to the response. And the reason is not to be found in the contingent factors of resources, governance, or leadership. Rather, the inability of today's institutions to meet tomorrow's challenges is rooted in the very structure of those institutions and in the embedded action processes that this structure generates. If a postsecondary institution is concerned about learning outcomes such as analytical thinking, problem solving, effective communication, and information and quantitative literacy as well as disciplinary content knowledge, how can it deploy its resources to optimise student learning when those resources are organised within the walled compartments of discipline-based departments? Technological societies now expect, and need, of baccalaureate graduates not only competencies but competence—not only domain-specific skills, but the generic ability to adapt to new circumstances. Graduates can no longer thrive simply by knowing what, or even knowing how. They will increasingly depend not on what they know but on their ability to find out, to learn. Can packaging learning in modular courses designed by disciplinary specialists prepare students to become active strategists of learning, to engage in interdisciplinary problem solving, to develop the capacity to think for themselves with independence and integrity while acting within interdependent learning communities?

Such questions assume that form should follow function in organising a university. Perhaps no society has so readily sacrificed institutional forms for functional effectiveness as the U.S. Yet no social institution in the U.S., with the possible exception of organised religion, holds more tenaciously to its traditional structures than higher education.

Is there some ideal form to which universities should conform to be 'true' universities, or should they continuously reform themselves for maximum effectiveness? Put another way, should higher education institutions be judged by how well they reflect an accepted ideal of a university or by how effectively and efficiently they educate students? Or, looking at the institution, as we too rarely do, through the lens of the student, do universities themselves reflect the qualities that they aim to create? If the role of the university in our century is to produce adaptable, flexible, self-correcting learners, to

[1] "Throughput" refers to the volume of work flowing through an organization. In this case, it refers to the number of students moving through a degree programme or a collection of degree programmes.

[2] Pascale, Richard T., Millemann, Mark, and Gioja, Linda. (2000) *Surfing the Edge of Chaos: the Laws of Nature and the New Laws of Business,* New York, Crown Business, p1.

what extent are our universities prepared to adapt, to correct their own errors, and to reshape themselves quickly and efficiently to new needs and challenges?

The two principal architects of Western thought held opposite views on the relative importance of form and function. Plato believed in immutable, ideal forms that observable objects imperfectly represent. Historically, we have tended to be Platonists when shaping and evaluating postsecondary institutions; they are usually judged by how well they approximate the ideal academy. In this case, improvement means making an institution more congruent with the accepted ideal academic form.

Aristotle, on the other hand, believed form should fulfil function. David Krakauer succinctly contrasted Plato's and Aristotle's views on form and function.

> Plato thought of form as structure, arrangement, and order—how a thing must be put together. According to Plato every concrete being, insofar as it exists, has form. Every organic being, insofar as it continues to live and function, possesses order. For Plato, function is subsumed within form, and is a secondary quality, in other words function follows form. For Aristotle function was pre-eminent, and the coordinated hierarchy of the living world reflected increasingly complex functions. Form should be understood as that which fulfils a function; this is Aristotle's teleology - the principle of final causation. Thus form follows function. [3]

While the form and function debate continues among philosophers, modern societies have generally decided, particularly as related to institutions that power economies, that form follows function. For example, Louis Sullivan helped to imprint "form forever follows function" in architecture. Frank Lloyd Wright, who worked for Sullivan and became, as he put it, the "pencil in Sullivan's hand,"[4] reworded Sullivan's dictum -- "Form follows function—that has been misunderstood. Form and function should be one, joined in a spiritual union."[5]

What then is the function of a university? The core and central function of the undergraduate university, widely acknowledged and almost universally espoused, is student learning. Universities exist so that students may learn what they need to know, and learn to do what they need to do. Assuming that form inevitably follows function in technological societies and that student learning is the primary function of most of postsecondary education, university leaders would be expected to seek organizational forms that deploy resources for their maximum contribution to student learning. Jacques Ellul in *The Technological Society* assures us that one immutable law governs the future of all institutions in technological cultures–efficiency. For Ellul, a technological society is one committed to technique; by technique, he means the most efficient way of doing something. In other words, forms inevitably yield to function; a form governed by the principle of efficiency, becomes constantly malleable to its functional purpose. Though machines, computers, or gadgets symbolize technology for us, technique includes any efficient way of accomplishing an end. For example, once technology, supported by the basic sciences of biology, chemistry, and physics, entered agriculture, small, labor-intensive farming began to disappear. The ideals of small farms with intact families fell before the invincible rule of efficiency. Efficiency depends not simply upon the correct performance of individual tasks, but upon their coordination. It has been noted before that the introduction of machines, even highly sophisticated ones, does not produce an industrial society. Modern economies are *systems* in which the parts function in effective coordination.

W. Edwards Deming, the chief architect of the quality improvement movement now woven into the fabric of thriving manufacturing and service organizations, explained that quality results from optimization. Organizations sub-optimize when their people and processes do not work together as a system. While Deming was trained as a mathematical physicist and worked as a management consultant and statistician, he also wrote high church music. For him, an orchestra is an optimized system.

> An example of a system, well optimized, is a good orchestra. The players are not there to play solos as prima donnas, each one trying to catch the ear of the listener. They are there to support each other. Individually, they need not be the best players in the country.

---

[3] Krakauer, D. (2003) 'An Introduction to Form and Function,' *The Integration of Form and Function: A Joint Workshop of the Santa Fe Institute and the Collegium Budapest Institute for Advanced Study*, November 10. URL: http://discuss.santafe.edu/formandfunction/introduction. Last accessed: 1 June 2005.

[4] Lieber-Meister. *Louis Sullivan: The Architect and His Work*. URL: http://www.geocities.com/SoHo/1469/sullivan.html#auditorium. Last accessed: 1 June 2005.

[5] Frank Lloyd Wright, *Quotes*. URL: http://www.cmgww.com/historic/flw/quotes.html. Last accessed: 1 June 2005.

> Thus, each of the 140 players in the Royal Philharmonic Orchestra of London is there to support the other 139 players. An orchestra is judged by listeners, not so much by illustrious players, but by the way they work together. The conductor, as manager, begets cooperation between the players, as a system, every player to support the others.[6]

Higher education institutions should function as systems for student learning. In systems optimized for student learning, students, faculty, staff, and processes—instructional and administrative—work together to facilitate student achievement. Forms would be shaped and adapted to the governing function. The value of each component would be judged by its contribution to student learning outcomes. From this perspective, a university's quality is judged by the capacities and abilities its graduates develop. And if we seek to discover the institutional contribution to the excellence of its graduates, we will consider the learning outcomes of its *typical,* not its exceptional, students.

In the past, institutions have been judged by their formal characteristics. Does the university have sufficient classrooms, sufficient books in the library, sufficient faculty members with sufficient degrees and publications? The formal characteristics of the ideal university, such as faculty credentials and publications and admissions selectivity, serve as prestige indicators. Quite different forms will optimize functional objectives: instructional teams working collaboratively will produce more consistent student learning outcomes than individual faculty members working separately. An integrated system adjusted according to feedback about learning results will produce more consistent and better results than isolated geniuses working independently, even if they really are geniuses. Universities often take pride in their exceptional students or graduates; in so doing, they are in effect claiming responsibility for statistical outliers that the instructional system did not produce. Rather institutions should determine their effectiveness by the performance of its typical student or graduate. As discussed later, system is not responsible for special cause variation only for common cause variation. Aside from statistical theory, Aristotle reminded us "For one swallow does not make a summer …"[7]

Does an institution's mission statement reflect its functional system? Ideally, but rarely. Many institutions proclaim student learning as their primary focus while organising themselves for discipline-based research and scholarship. Most institutions, in other words, declare a mission, but maintain processes that are not well aligned with the declared mission. Most universities adopt maintenance of accepted academic form as their compass rather than mission fulfilment. George Kuh, Jillian Kinzie, John Schuh, Elizabeth Whitt, and their associates at the National Survey of Student Engagement (NSSE) in the U.S., have just completed a study of the institutions that performed above expectations on the survey. These institutions are identified by the project name: Documenting Effective Educational Practice (DEEP). In their book *Student Success in College: Creating Conditions That Matter,* they conclude that every institution really has two missions: the espoused mission and the enacted mission. Every institution espouses a mission that puts students and their learning at the centre of institutional activities. But most institutions enact a very different mission. "DEEP institutions are distinctive," they conclude, "because the gap is smaller between their espoused mission and their enacted mission than at most other schools."[8] The DEEP institutions, in other words, exhibit a consistency and constancy of purpose unusual in higher education. They re-examine and reshape their form to serve the functions that their mission proposes. Constancy of purpose, one of Deming's keys to quality, demands continuous innovation, and research into process and product, and continuous improvement.[9] But universities maintain continuity by adopting accepted structures and forms. In other words, they sacrifice function to form rather than shaping form to function.

Most institutions of higher education, even those that explicitly aim to made education available to the general population, are organised into vertically aligned departments and divisions, silos that go up and down the organisation but rarely meet or intersect horizontally. Currently undergraduate programmes are organised by the disciplines in which doctor of philosophy degrees are earned. We suggest two alternative organisational models to the vertical silo model for those institutions for which postsecondary education is the primary mission. The first alternative organisation we suggest is a *horizontal system.* The optimal organisation, we believe, is a horizontal system that functions *organically*.

---

[6] W. Edwards Deming (1993) *The New Economics: For Industry, Government, Education,* Massachusetts Institute of Technology, Center for Advanced Engineering Study, p99.
[7] Aristotle, *Nicomachean Ethics Book 1*, Section 7. URL: http://classics.mit.edu/Aristotle/nicomachaen.1.i.html. Last accessed: 1 June 2005.
[8] Kuh, George, Jillian Kinzie, John H. Schuh, Elizabeth J. Whitt, and Associates (2005) *Student Success in College: Creating Conditions That Matter*, San Francisco: Jossey Bass, p26.
[9] Deming (1993), p25-26.

2 Bureaucracy of Silos

Modern universities are generally organised as bureaus of loosely coupled, discipline-based compartments or silos. This organisational pattern is *bureaucratic* in the sense that it is organised into divisions based upon professional expertise rather than lineage or personal connection. The first governmental bureaucracies emphasised merit over kinship or fealty, in contrast to the court's emphasis on family connections or loyalty to a liege. For its era, bureaucracy was a major democratising step and influence. It served as a check on the corrupting and debilitating influence of the ruler's court composed of his kin and favourites. It is also true that a professor holding lifetime tenure is perhaps the closest thing in modern industrialised countries to an aristocracy, a position of status assured for life without any corresponding accountability for specific performance. But the original impetus for tenure and other professional perquisites was to make the professoriate independent of external influence. It was intended to be an aristocracy, but an aristocracy of ability and merit rather than of lineage or loyalty. A university bureaucracy composed of disciplinary silos supports research by organising faculties according to disciplinary specialisations into departments. By adopting bureaucracy as its organising template, the modern university, with its emphasis on scholarship defined by disciplinary experts, greatly increased the likelihood that individuals would succeed based on what they knew, rather than who they knew.

The silo organisation of universities has facilitated advanced scholarship and scientific research by elite faculty and students. On the other hand, it was not designed to educate a majority of young adults in cultural literacy and life and vocational skills. As originally envisioned, research universities were at the top of competitive educational winnowing systems that provided universities with accomplished and able students. But such universities also became the paradigmatic model of higher education, largely because of their conspicuous research contributions and the high quality of their graduates. Thus as higher education has expanded it has kept the essential form of disciplinary-departmental silos for the organisation of most of its educational work. In the U.S., open-access, two-year community colleges, which educate a substantial plurality of new college students, are generally organised into the same departmental silos as flagship research universities, even though their faculty are required to do no research at all and many of their students have no majors. The model of bureaucratic silos has become all but ubiquitous in conventional colleges and universities.

But constructing facsimiles of research universities to educate the general population is both inefficient and ineffective. The typical Ph.D.-holder is not trained to teach foundational competencies, and like any overqualified, underemployed individual, he or she quickly loses interest. The core, foundational abilities that should define higher education such as writing, speaking, teamwork, analysis and synthesis, and quantitative reasoning often result more from modes of learning than from any particular content. They are all cross-disciplinary and emerge more powerfully from applications in varied contexts than from disciplinary specialisation. Ph.D.s generally have little or no training in the cognitive sciences, instructional design, teaching strategies, or assessment of competencies or literacies. They are what they are trained to be—specialists in content, usually content in a very advanced, narrow area. In perhaps no other human endeavour would we employ personnel and means so inconsistent with the desired outcomes, forms so thoroughly antithetical to function. And we must emphasise again that the discontinuity here is not incidental or accidental; it flows from the fundamental organisational structure of the institution.

When asked why professors do not use the most effective ways to facilitate student learning, the common assumption is that the fault is in the faculty—their training, attitudes, and knowledge. Deming and the leading quality thinkers would say, 'Question the system first before blaming the faculty.' For what achievements are faculty rewarded by the university? What incentives does the system provide? What effect does the seat-time credit system and the teacher serving as both mentor and tester have on teaching? What do typical classrooms suggest about teaching? How does requiring a research-based Ph.D. and not providing or requiring any preparation in instructional design, test development, or learning facilitation square with the major responsibility of teaching? The current silo-organised university produces what it was designed to produce—research and publications— while treating undergraduate teaching as incidental work to support graduate studies and scholarship.

2.1 Knowing what and when to change. If faculty and administrators wish to take a systems approach to improving student learning, they will have to learn to distinguish between common and special cause variation. Tinkering with a system without heeding this important distinction will usually degrade rather than improve its performance. Variation, of course, occurs normally within all systems. Some variation falls within a normal range of distribution. Any system will produce a range of variation in its results, or in any measurable processes or outcomes. Some of those variations fall within the range of normal variation around a mean level of performance or outcomes that the common features of the system will tend to produce. These variations have a common cause. While there will be ongoing variation, the range of variation produced by common systemic causes will tend to cluster within a predictable

range around the stable mean. To alter the mean, and change the long-term pattern of common cause variation, requires changing the system. Some variations, on the other hand, have special causes and hence are not produced by the system but are exceptions and statistical outliers. Failure to understand this distinction, according to Deming, leads to two serious mistakes:

> Mistake 1. To react to an outcome as if it came from a special cause, when actually it came from common causes of variation.
>
> Mistake 2. To treat an outcome as if it came from common causes of variation, when actually it came from a special cause.[10]

In the university organized as loosely coupled silos, the system stimulates both categories of mistakes by obscuring or concealing data about common causes and indeed creating confusion about the real origin of problems. Administrators and faculty members who work in silos develop focused expectations; their perceptions are biased toward what they have control over, and they only have control over the activities in their silo. The light of information shines only where they are standing, so their perception of the institution at large or of their students' experience outside their classrooms falls into the shadow world of conjecture and hearsay. Hence they readily confuse common with special causes of variation. In the bureaucratic tradition, institutions often address specific problems with general rule-making, without ever diagnosing the root cause of the problem. Changing a whole system to deal with an isolated case is like trying to adjust a thermostat to one individual's satisfaction. On the other hand, universities tend to look to special causes to explain the failure of students to master the basic competencies, rather than examining the curricular system.

Deming's concepts of common and special cause variation are most useful in monitoring quality when many items flow through a system. His point is that those managing such systems have to distinguish predictable variation from unpredictable isolated cases. The implication for deans, chief academic officers, and faculty is that they learn to change systems only when they observe a pattern of problems. That is, a policy and routine system should not be changed to fix an isolated problem. On the other hand, a sustained pattern of grade inflation will not be improved by dealing with individual cases. Nor will student learning be improved throughout the institution by identifying one faculty member as outstanding teacher of the year or by asking faculty members to do better within the existing system.

Most universities are prone to a particular form of mistake 2 because of the paucity of data they preserve about the outcomes of their work. While many students progress through the institution, the university—in most cases—collects and preserves little reliable information about what they have learned. In other words, they have insufficient evidence of outcomes to determine the actual variations in learning outcomes and to calculate the mean level of system performance. In this environment, the temptation is great to focus on dramatic anecdotes of either success or failure: the extraordinary student who becomes a star in graduate school or publishes his/her senior thesis, the student who submits the same bad essay for three classes, in none of which does it fit the assignment. The unusual and provocative anecdote is especially memorable for the same reasons that it is probably a statistical outlier resulting from special causes of variation. Reasoning about the system from anecdote leads to making policy based on special causes of variation in the absence of evidence that would allow one to differentiate common causes of variation.

2.2 Dead-ends to improvement. Universities, of course, recognize many of their problems. And they expend a good deal of effort to improve the quality of education they provide. But they generally channel those efforts through the silos that define the system. Deming frequently pointed out the error of tinkering with, rather than redesigning, systems. Higher education often makes three consistent mistakes in attempting to improve systems: (i) rewarding individuals without taking into account system effects, (ii) rewarding A and expecting B, and (iii) providing training when the system is the problem. Often, administrators take these steps because they do not know any better. It is also easier to patch over a problem than to study a system to determine if it is in control and to search for root causes of excessive variation or unacceptable mean performance. Furthermore, these three steps suggest that the problem lies in the people, not the system, and thus frees managers and decision-makers from the responsibility to reexamine basic structures.

(i) *Individual Rewards*. Despite abundant evidence to the contrary, organisations continue to recognise and reward individuals for outstanding performance, believing it will improve overall performance. This approach, of course, assumes that the design of the individual's work is well aligned with the institution's purpose and that the key to better results is to get people to do their work better, harder, or more enthusiastically. To put it another way, it assumes that the existing form is well aligned with the intended function and that we need only "fill" that form completely to improve

[10] Ibid., p178.

outcomes. Deming summarises this fallacy as follows: "Reward for good performance may be the same as reward to the weather man for a pleasant day."[11] In *The New Economics*, he describes the wrong-headedness of using merit pay to improve quality. Alfie Kohn in *Punished by Rewards* provides an excellent, non-technical review of the problem of trying to change group behaviour by individual rewards.[12] Deming uses an equation with two unknowns to demonstrate the inherent error of individual rewards:[13]

> p = x + xy
> p = measured performance
> x = an individual's contribution *(known)*
> xy = the system's effect on performance (*unknown*)

Such an equation could be applied to evaluating a faculty member in terms of his or her contribution to student learning.

> s = x + xy
> s = measured student learning
> x = effects of instructor's efforts
> xy = interaction effects of 'x' instructor's efforts with 'y' system or environment, i.e., effects of the students' background, abilities and attitudes, instructional resources, interaction of this instructor's pedagogy with that of other instructors also interacting with the student, physical circumstances of learning space, etc.

'Effects of instructor's efforts' or 'x' cannot be calculated since 'y' is unknown. To equate faculty merit 'm' (i.e., merit pay and teacher-of-the-year awards, promotion) with measured student learning, 's', falsely assumes the system or environment has no effect on 's', measured student learning. But colleges and universities persist in rewarding individual faculty members with teacher-of-the-year awards. If an institution focused on improving the learning of its typical students, it would allocate and deploy its resources to optimise curricula as learning systems. Getting faculty to 'teach harder' in their existing silos is largely a futile endeavour. We discuss below ways of redesigning the work of faculty that would result in radically improved outcomes.

(ii) ***Rewarding A and hoping for B***. One of the most obvious problems in improving student learning is the misalignment between a faculty member's primary work–helping students learn–and the faculty reward system. This persistent lack of alignment is quite obvious to informed observers, particularly management specialists such as Steven Kerr. Kerr has served on the faculties in management at Ohio State, the University of Michigan, and the University of Southern California, where he was dean of the faculty for five years. He has also been vice president for Corporate Management Development at General Electric and president of the Academy of Management. The Academy of Management declared his article, 'On the Folly of Rewarding A, While Hoping for B,' an Academy of Management classic. "For almost twenty years, its title has reminded executives and scholars alike–'It's the reward system, stupid!'"[14] From his perspective as both a scholar and a practitioner of management, Kerr reaches the following conclusion about the university reward system:

> Society hopes that professors will not neglect their teaching responsibilities but rewards them almost entirely for research and publications. This is most true at the large and prestigious universities. Clichés such as "good research and good teaching go together" notwithstanding, professors often find that they must choose between teaching and research-oriented activities when allocating their time. Rewards for good teaching are usually limited to outstanding teacher awards, which are given to only a small percentage of good teachers and usually bestow little money and fleeting prestige. Punishments for poor teaching are also rare.
>
> Rewards for research and publications, on the other hand, and punishments for failure to accomplish these, are common. Furthermore, publication-oriented résumés usually will be well-received at other universities, whereas teaching credentials, harder to document and quantify, are much less transferable. Consequently it is rational for university professors to concentrate on research, even to the detriment of teaching and at the expense of their students.[15]

---

[11] Ibid. p29.
[12] Kohn, Alfie (1999) *Punished by Rewards: The Trouble With Gold Stars, Incentive Plans, A's, Praise, And Other Bribes*, Boston, Mass.: Houghton Mifflin.
Deming, W. Edwards (1994) *The New Economics for Industry, Government, Education*, Cambridge, Mass.: MIT Centre for Advanced Educational Services, p26-27.
[14] Kerr, Steven (1995) 'On the Folly of Rewarding A, While Hoping for B,' *The Academy of Management Executive*, Vol.9, No.1, pp7-14. URL: http://pages.stern.nyu.edu/~wstarbuc/mob/kerrab.html. Last accessed: 1 June 2005.
[15] Ibid., p3.

The reward system emerges from the silo organization: the institution ultimately rewards those whose work fits within the form the institution has prescribed, those who exert their efforts within the silos. The way to rise in a vertical disciplinary framework is through research. But significant portions of undergraduate learning are interdisciplinary, seeking horizontal connections. So the function of teaching does not fit well with the form of silo organization. The espoused mission, the declared function of the university, is constantly deflected and defeated by the enacted mission of preserving the institutional form. It is perhaps worth noting that this persistent incongruity between the reward system of the university and its declared purpose, this glaring gap between the institution's espoused and enacted mission, is in no sense a new development. Consider another attempt to call it to the attention of the academic community: "Thus it would be the greatest mistake to estimate the value of each member of a faculty by the printed work signed with his name. There is at the present day some tendency to fall into this error; and an emphatic protest is necessary against an attitude on the part of authorities which is damaging to efficiency and unjust to unselfish zeal."[16] That warning was written by Alfred North Whitehead in his essay on 'Universities and Their Function,' nearly 80 years ago. The persistence of this dysfunction for more than a century is ample evidence that its origin is not in surface policy or unenlightened leadership but in the fundamental structure of the institutions. Improvement of undergraduate education faces no greater problem than the academy's failure to make facilitation of student learning the primary criterion for promotion and tenure.

(iii) ***Unneeded training***. Most academic administrators budget significant funds for faculty development. These funds support a variety of faculty activities—participation in national disciplinary associations, time and travel for scholarship or research, and sometimes for learning about teaching and learning. In some cases, the use of such funds is directly related to a clear purpose, such as uninterrupted time on a research project or completing an article or book. But in many cases, the purpose of the expenditure is unclear or its use is unrelated to the stated purpose. These funds are often justified as developing faculty to be more effective teachers, assuming that training will result in greater effectiveness.

Business training consultants Robert F. Mager and Peter Pipe describe the basic mistake that occurs repeatedly in business and industry of assuming that training improves poor performance. Training will not change performance where doing the right thing is punished, not recognised or rewarded, or makes no difference to anyone. They recommend that organisations systematically seek to determine whether poor performance results from a lack of skills that could be addressed by training or a work system that needs to be changed. It's only a training problem if the individual or group could not perform satisfactorily if their "life depended on it."[17] In other words, if people could perform well in a different setting or with different motivation, then the problem isn't their skills: it is the setting or the motivation.

Indeed, this can be seen as a manifestation of Deming's mistake 1, discussed above. Universities tend to interpret poor learning outcomes as results of special causes of variation: individual faculty members' skills and preparation. But it is more likely to be the case that faculty work in a system in which there are simply no organisational consequences for good teaching. Poor outcomes are more likely to result from a common cause of variation than a special cause, and training will do nothing to change the system in which poor teaching goes unpunished, good teaching unrewarded, and teachers never receive significant feedback about the consequences of their work. Seminars on effective learning and teaching strategies, design of valid and reliable tests, and effective use of instructional technologies have little or no effect if the faculty already have those skills but the system fails to encourage, or even discourages, their use. If there are no consequences for good or poor teaching, and if best teaching practices run against the grain of one's department, more pep talks and seminars on better teaching will only irritate and not help. But as is the case with teacher-of-the-year awards, it is less trouble and less expensive to provide development funds and seminars than to study the system and do the hard work to change it.

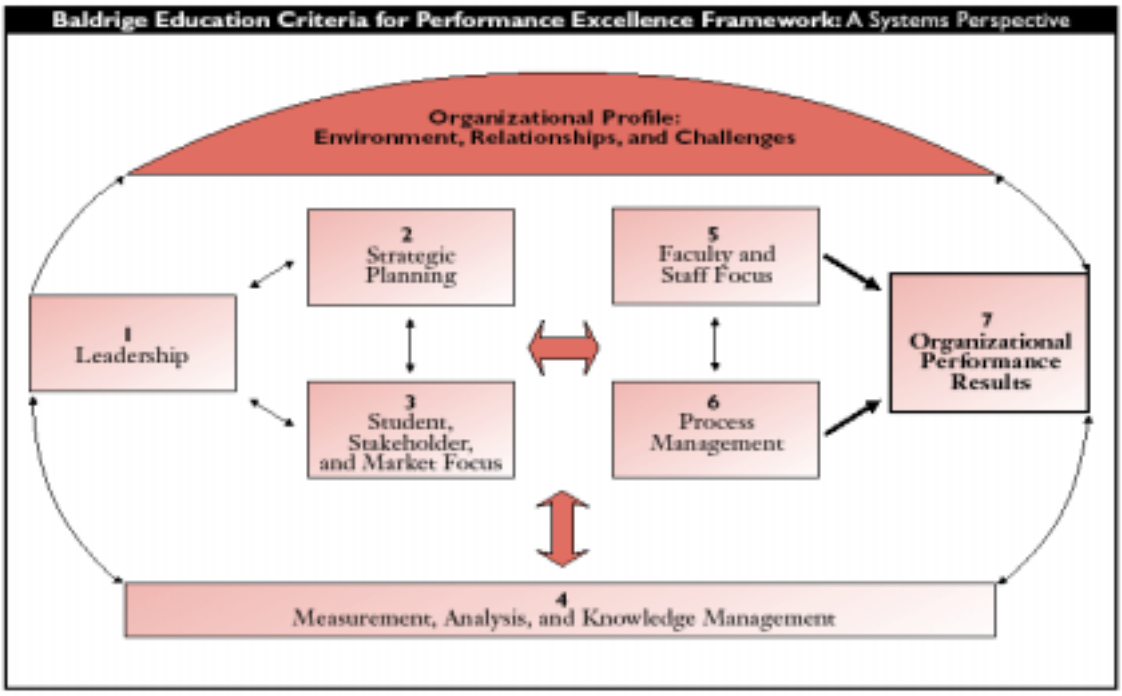
[16] Whitehead, Alfred North (1929) 'Universities and Their Function,' in *The Aims of Education*, New York, N.Y.: The Free Press, p99.
[17] Mager, Robert, and Pipe, Peter (1983) *Analyzing Performance Problems*, 3rd Edition, Atlanta, CEP Press.

3 Horizontal Systems

While colleges and universities focused on teaching average students maintain the research university organisational structure, their host economies demand cost-effective educational strategies to produce responsible citizens and productive workers. This conflict accounts for much of the current demand for accountability and assessment.
The basic competencies needed by modern economies can be developed more cost-effectively through educational systems less dominated by discipline-based departments. Instead of creating feedback on functional outcomes, universities live by a "logic of confidence." They monitor formal credentials, processes, and resources--sometimes referred to as "ritual classifications"--and assume that the forms imply the functions.[18] This logic of confidence requires, in fact, that all parties trust the forms and do not inquire into functional outcomes. One aspect of this logic is that those working in one institutional silo must wear blinders, in effect. The overall performance of the organisation, the throughput processes, and the final product are not the primary concerns of disciplinary faculty. When processes are continuously improved and seamlessly connected, such systems can yield consistent outcomes at reasonable costs.

Adoption of comprehensive, continuous improvement requires leaders to understand and manage their organisations as flow-through, cross-functional systems designed to produce assessable outcomes. The following diagram (Figure 1) from the 'Baldrige *Education* Criteria for Performance Excellence: A Systems Approach' replicates the Baldrige diagram in the Baldrige Criteria for Performance Excellence for *business and industry*. This demonstrates the widely shared assumption that an educational programme can and should be managed as a system in the same manner as modern businesses and industries are managed.

Figure 1[19]



[18] Meyer, John W. and Rowan, Brian (1983) 'The Structure of Educational Organisations' in J. Victor Baldrige and Terrence Deal, *The Dynamics of Organisational Change in Education,* Berkeley: McCutchan Publishing Corp.
[19] *Education Criteria for Performance Excellence 2003*, Baldrige National Quality Programme, p. 5. URL: http://www.quality.nist.gov/PDF_files/2003_Education_Criteria.pdf. Last accessed: 1 June 2005/

3.1 Principles of Horizontal Organisation. Flow-through, cross-functional systems as advocated by Deming are essentially horizontal organisations, and horizontal organisations are distinguishable from vertical silo bureaucracies in several ways. Frank Ostroff[20] provides a useful list of these differentiating characteristics which are paraphrased and applied to higher education in the following summary.

1. Horizontal organisations are shaped by their core, cross-functional systems or processes; that is, functional tasks or functions that constitute systems are not divided into compartments or silos. For higher education this suggests that curricula should be designed as flow-through learning systems with minimal compartmentalisation.

2. An individual or team owns and manages each learning system. Too often curricula are a collection of courses with individual faculty owning certain courses but with no one or no group responsible for the curriculum or learning system as a whole. Chief academic officers, provosts, vice presidents for academic affairs, and deans, function more as personnel and budget managers than as learning officers. Curriculum committees usually spend most of their time approving courses put before them as free-standing units of instruction; they are rarely engaged in reviewing curricular learning outcomes and prompting curricular reforms. Departmental faculty members generally focus on their particular courses and their own research interests. In a horizontal organization, teams would take responsibility for achieving learning outcomes and so would be organized in terms of students' learning experiences and activities rather than disciplinary divisions.

3. Teams rather than individuals would take responsibility for most functional goals. In the silo structure, classroom teaching is usually done by a single faculty member with little or no on-going interaction about the students' learning. On the other hand, a horizontally organised degree programme or curriculum would be mediated by teams composed of individuals whose particular strengths complement one another.

4. Horizontal systems minimise hierarchical authority removed in distance and time from the work being done. In horizontally organised colleges and universities, faculty teams are empowered to modify content and instructional practice to meet institutionally endorsed student learning outcomes. This suggests a shift in the current logic of confidence. Instead of assuming that outcomes are assured by standardised credentials, resources, and processes (faculty credentials, seat time, credit hours, and common instructional practices), the organisation makes outcomes the standard. A shift from standards based on inputs to standards based on outcomes would allow and encourage adapting process to assure certain agreed-upon outcomes.

5. A horizontal organisation implies that there are suppliers to and receivers of the work; in other words, the work, teaching or instruction, is not an end in itself. Horizontally organised degree programmes would integrate into their educational systems information and feedback from those who send them students and those who receive their graduates. All educators know that their outcomes are very dependent on the abilities and general readiness of their entering students; and it makes sense to develop close relationships with graduates' employers and graduate and professional schools.

6. Horizontal organisations provide the people who work in them with the resources and support to accomplish the goals they set out to achieve. Colleges and universities generally assume that expertise in a faculty member's discipline is sufficient to make a faculty member an effective instructor. The horizontally organised university would support faculty teams with the resources in the cognitive sciences, instructional and test design, and instructional technology that would enable them to do their work most effectively. It is encouraging that some Ph.D. programmes are beginning to develop programmes to strengthen their students' teaching abilities. The Carnegie Foundation for the Advancement of Teaching is providing important leadership in encouraging academics to consider the importance of teaching and in promoting a better understanding of the most effective pedagogies. Carnegie is publishing a series of books on the scholarship of teaching and learning that provide both guidance and models for institutions seeking to empower their faculties to take responsibility for educational outcomes.

7. Higher education is the domain of specialists which the silo organisation protects and defends. But horizontal organisations need multi-skilled people who are creative and flexible to form cross-functional teams that can deal with new challenges. In much of higher education, searches for new faculty favour those with prestigious, international reputations in highly specialised areas. In contrast, institutions committed to effectiveness in undergraduate education need interdisciplinary, multi-skilled faculty who contribute to cross-disciplinary and cross-functional learning systems.

[20] Ostroff, Frank (1999) *The Horizontal Organization: What the Organization of the Future Looks Like and How It Delivers Value to Customers*, New York, Oxford University Press, p10-11.

Furthermore, the reward systems of tenure and promotion generally favour the disciplinary, research specialists rather than the teacher who is able to teach across several cognate disciplines and to use multiple teaching strategies. Institutions should hire faculty for the institution's actual mission and for the faculty member's primary work.

8. Horizontal organisations find ways to redesign and deploy functional units so that they partner to optimise the performance of the overall system. In contrast, it is often difficult for a faculty member in one department to co-teach a course with a professor in another department because of budget and workload accounting. Because universities work on the logic that quality is assured by credentials, they assume that only a Ph.D. in English can teach composition while a historian or chemist may actually teach it more effectively. Frequently, general education reforms, particularly those that favour interdisciplinary learning, are blocked by departments concerned about their share of the lower division enrolment. As discussed above, parts of a system should work together to optimise the whole system. When one department works for its own advantage without regard to the whole system, the system is sub-optimised. The tenacious grip of silo organisation on the academy makes it difficult, if not impossible, to optimise undergraduate learning.

9. To optimise a system, it must be judged by its outcomes not by conformity to standard practices. Horizontal organisations treat systems and processes as malleable means to intended outcomes. Academic institutions tend to standardise processes and personnel. The assumed logic is that traditionally credentialed faculty, commonly accepted curricular content, and customary instructional processes will produce the desired outcomes. Obviously, standardised educational practices used with students who vary in their abilities and backgrounds will produce varied achievement outcomes without necessarily assuring minimal thresholds of competency.

3.2 Ambidextrous organization. Completely horizontal, cross-functional organizations of any kind are quite rare, and essentially nonexistent in higher education. We can see some features of the horizontal organization in the new for-profit institutions that are making better use of technology and emphasizing faculty teamwork and collaboration as a matter of course. But even these institutions have only made partial modifications in the standard organizational template. While most organizations retain some element of silos patched together within a bureaucratic frame, they also have to operate somewhat cross-functionally for the sake of effectiveness and efficiency. They are ambidextrous: sometimes maintaining continuity with their right hand and initiating change with their left.

Richard Daft describes organizational ambidexterity as follows:

> [T]he initiation and the utilization of change are two distinct processes. [C]haracteristics such as decentralization and employee freedom are excellent for initiating ideas; but these same conditions often make it hard to use a change because employees are less likely to comply. Employees can ignore the innovation because of decentralization and a generally loose structure.
>
> How does an organization solve this dilemma? One approach is for the organization to be ambidextrous–incorporate structures and management processes that are appropriate to both the creation and use of innovation. The organization can behave in an organic way when the situation calls for the initiation of new ideas and in a mechanical way to implement and use the ideas. [21]

Dealing with the same issue, Peter Drucker says managers have to balance *change* and *continuity*.

> Change and continuity are thus *poles* rather than opposites. The more an institution is organized to be a change leader, the more it will need to establish continuity internally and externally, the more it will need to *balance* rapid change and continuity.[22] (Emphasis added)

One example of adhocracy or ambidexterity in physical campus planning is how brick sidewalks are planned at the University of North Carolina at Chapel Hill. For years, it was rumored that campus planners would lay the famous Chapel Hill brick walks where students made paths rather than laying them by a preconceived plan. When asked, a Chapel Hill professor of mathematics commented as follows on the practice:

> The story [about Chapel Hill brick walkways] you relate is correct (or at least almost). I am not sure how long the practice was in place but it is the case that a person in charge of such matters here during much of my tenure had the following

[21] Ibid., p138.
[22] Drucker, op.cit., p90.

policy: If people demonstrated they were going to walk a path on campus by wearing a path in the grass, he would put a brick walk there. This certainly can be evidenced by the following:

- There is not a geometric pattern for our walkways.
- Over my 38 years here, I have seen many worn paths converted to brick walkways.

It is a great plan of operation. I have also visited many campuses with nice designs for their walkways, but there were many paths worn where people found for themselves where they were needed. A colleague (now retired) was a student here in the 50's, and he has told me that most of the campus walkways were just "paths" then covered with what is called "Chapel Hill gravel." I suspect that caused the walkways to be dictated by the walkers. Starting in 1965, I can testify that if a path appeared, as made by the walkers, that the bricks soon appeared. [23]

Rather than spending endless hours of haggling over curricular structures on matters like prerequisites and detailed mapping of step-by-step instruction within courses, could educators establish endpoints of learning, provide reasonable resources for students' learning and stand back to see the paths they make to those learning destinations? It is often debunked, but sometimes, 'ready, fire, aim' is the most effective way to get things right.

While designing a curriculum is obviously more difficult than planning a walkway, the principle of having definite destination points and laying the bricks in the paths made to the destinations has implications for developing learning experiences for certain objectives. There is now a substantial body of research on how people learn most effectively. We can confidently predict, for example, that most people who want to increase their knowledge or skills in a given domain would not first seek to listen to three hours a week of lectures on the topic. We know that students will pursue more efficient paths toward knowledge when they see the relevance of the question at hand to their own lives. And we know that people cannot improve their performance in the absence of feedback. Thousands of experimental subjects have already trod the paths of learning to show us where to lay the curricular bricks. But beyond that, we can apply the principle directly, through the scholarship of teaching and learning. One of us recently had the pleasure of observing a disarmingly simple and straightforward application of this principle at an American college. Two instructors videotaped a small group of students discussing a chemistry problem. They then extracted from the transcribed tapes a sequence of excerpts that could be shown both to students and other faculty as an illustration of problem-solving process that demonstrated the use of representations and laid out the path toward a solution. Some of the paths these students took were not the most direct or 'logical,' but when faculty were able to see how the discovery and correction of their errors reinforced their learning, they began to see as well the value of letting the students lay out the path of learning through the process of discovery.

The ambidextrous organization can develop its capacity of innovation and functional adaptation even within the flawed silo structure. A university organized by discipline silos can enhance its ambidexterity by overlaying an interdisciplinary, cross-functional, horizontal template on its bureaucratic structure. One can imagine a matrix organized university in which learning systems are horizontal, integrated systems cross-stitched with vertical administrative and support functions. The silo organization, however, will remain a barrier to optimization complicating and retarding effective innovations.

4 Toward Horizontally Organised Academic Systems

4.1 Curricula as systems. As indicated earlier, a system is a collection of activities aimed at achieving a goal. In many cases, undergraduate curricula are a collection of courses developed with no explicit, observable ends in mind. In contrast, a curricular system would be composed of learning experiences designed and welded together to result in certain student proficiencies. Such a curricular system would be continuously evaluated by its effectiveness in producing the desired results; consequently, it would be continuously changed to optimise student learning. Viewing a curriculum as a functional system reveals the systemic relationships of its parts in a functional perspective. If the mission of the organisation is to produce student learning, then the chief agent of the essential work that the system does is the student. Thus adopting a functional perspective on the system requires that we adopt a student perspective. If we look at the curriculum from the formal perspective, the content of the various silos exists simultaneously. But as experienced by the student, courses and other learning experiences are clustered in time (terms, years) and experienced sequentially.

[23] Smith, William W. , Professor, Department of Mathematics, University of North Carolina at Chapel Hill, personal communications, May 6-7, 2003.

4.2 Designed courses. Courses or components within a curricular system would be designed to contribute to the system's intended outcomes. This is very different from asking a faculty member to outline the content to be covered in a course. A systematically designed course, like the curricular system of which it is a part, is constructed of learning experiences that facilitate students reaching the desired achievements. Faculty and staff would design learning experiences informed by the best research about human learning and instructional techniques. Thus, faculty would design courses in terms of their contribution to the overall curriculum. Budgeting would be a part of course design; that is, faculty would plan course within available time and resource limits. Technology and the physical campus then become tools that can be used flexibly to augment the overall system to function most effectively.

The design, collection, and production of course materials usually require the dedicated time of a team composed of a subject-matter specialist, an instructional designer, and a media specialist, along with clerical support. Since such time and materials represent a significant investment, the costs have to be recouped through tuition from significant enrolment. Capital-intensive approaches must be amortised through extensive use. Courses so designed can be delivered by many teachers to many students. At Rio Salado College—a public community college—using this approach, 19 full-time and seven half-time residential faculty members support 705 adjunct faculty members who instruct about 34,000 students.[24] The University of Phoenix—a private, for-profit university—instructs approximately 152,300 students with about 17,000 part-time instructors supported by approximately 300 full-time faculty members.[25] The Pew Course Redesign Project has managed to redesign a number of courses using technology to achieve better learning outcomes at lower cost.[26]

4.3 Facilitating administrators. Deming believed that supervision, i.e., directing workers, added no value. He believed that most people want to do the right thing; they want to take pride in their work. Poor outcomes are more the fault of poor systems than uncaring and lazy people. Therefore, he urged businesses to replace supervision with leadership. A Deming leader focuses on removing obstacles in the system that prevent workers from doing the work of which they can be proud. In his 14 points for the renewal of American industry, two deal with leadership as facilitation.

When education is organized as a horizontal system to optimize student learning, an administrator's task is to remove obstacles in the system that prevent instructors from taking pride in their students' learning. In most cases, student learning can be increased by improving the curriculum as a system, instructional strategies, and instructional support. One of the chief factors that denies educators pride in their workmanship is their ignorance of the consequences of their work. Teachers and administrators who are locked in their silos rarely see what is going on outside. How does what students learn in one class affect their success in others? How do learning experiences change students? The trajectory of the students through the larger system is concealed from the faculty, because faculty members usually get no feedback other than that they have designed themselves within the confines of their own courses. A curricular system would contain integrated and coordinated assessment of student work that would provide feedback to both students and teachers as to the student's progress toward the larger functional goals of the system.

The horizontal organisation with its built-in feedback loop is designed to provide information for re-shaping inputs and internal processes to produce desired outcomes. That is, it is designed for continuous adjustment to external conditions and to optimise its resources within its constraints. But the actualisation of the design depends on the quality of human relationships within the organisation. A horizontally organised undergraduate programme facilitates adapting to change more than the bureaucratic, silo model. Yet, horizontal design alone will not facilitate adapting to environmental change if trust is low and fear is high. Deming knew that fear would stifle the effectiveness of the best system. The eighth of his 14 points is: "Drive out fear, so that everyone may work effectively for the company."[27] Those with firsthand experience in quality improvement agree on the proposition: The *hard* stuff (statistical process control, designing the organisation as a system, etc.) is *easy*; the *soft* stuff (attitudes, relationships, etc.) is *hard*.

Undergraduate education programmes organised as horizontal systems can meet the demand for workplace competencies and literacies for life in technological economies. To try to meet this demand through institutions constituted by disciplinary and functional silos debases the research university model which serves a different purpose and serves it inefficiently.

[24] Personal communication, June 18, 2003. E-mail from Angela Ambrosia, Rio Salado College to Hope Dahlke, Samford University.
[25] Personal communication, June 18, 2003. E-mail from Elizabeth Tice, University of Phoenix, to Hope Dahlke, Samford University.
[26] See Centre for Academic Transformation website. URL: http://www.center.rpi.edu/. Last accessed: 20 June 2005.
[27] Ibid., p23.

5 Organic Organisation

For all of its advantages, the horizontal organization is the result of the mechanistic thinking that has deeply influenced modern cultures since Newton. Thomas Pitinger, Jr. describes the near total domination of the Newtonian, mechanistic paradigm in modern organizations as follows:

> From the 1680s onward, Sir Isaac Newton was the new Moses, presenting a few simple equations—the 'laws of nature'—that never failed in predicting the tides, the orbits or the movement of any object that could be seen or felt. Output was exactly proportional to input. Everything was equal to the sum of its parts. Newton's mechanics seemed so perfect, so universal, they became the organising principle of all postfeudal society, including armies, churches and economic institutions of every kind. The very equations of economics, including many in use today, were built explicitly on the principles of mechanics and thermodynamics, right down to the terms and symbols. The economy was said to have 'momentum,' was 'well oiled,' was 'gaining steam.'
>
> ….
>
> As a model for everything, Newtonianism, it turned out, had a problem: It worked only within the narrow range of Newton's instruments. The 'laws of nature' fell to pieces in space, as Einstein's relativity showed, and at the subatomic level, as quantum physics showed. Scientists realised that however useful in solving smooth, mechanical problems, Newton's calculus was meaningless in understanding the vast preponderance of nature: the motion of currents, the growth of plants, the rise and fall of civilisations.[28]

The *Oxford English Dictionary* defines "organism" as "An organized or organic system; a whole consisting of dependent and interdependent parts, compared to a living being."[29] Living organisms behave in ways that educational organizations would do well to emulate; that is, undergraduate learning programmes can approximate living systems in their design and behavior.

One of the most interesting proponents of businesses adopting the organic system paradigm is David Snowden, director of IBM's Institute for Knowledge Management [IKM] for Europe. In an interview with Steve Barth, editor at large of *Knowledge Management*, Snowden compares organic and mechanistic organizations.[30] For him, TQM and reengineering are mechanistic. He compares the mechanistic and organic approaches as follows:

Snowden Comparison[31]

Mechanistic	Organic
The mechanistic school is carrying on where they left off with business process reengineering, quality management, business intelligence and artificial whatever. That school is tool-obsessed. It believes you can find a goal and define the steps required to achieve that goal over a one-, two-, three-, or five-year time horizon.	The organic school, on the other hand, says that the journey is more important than the goal. All you can do is decide what direction you are going to set off in and create a sense-and-respond organisation that can change direction if necessary.
The mechanistic school still works on the scientific rationalism of Newtonian physics.	The organic school uses Heisenbergian physics and accepts irrational uncertainty.

This means that organisations are not machines that can be engineered and reengineered; rather, they are complex ecosystems organised around foundational values and "rule-sets."[32]

Daft compares mechanistic and organic organizations in operational terms.

---

[28] Petzinger Jr., Thomas (1999) 'A New Model for the Nature of Business: It's Alive! --- Forget the Mechanical -- Today's Leaders Embrace the Biological,' *Wall Street Journal* (Eastern edition), New York, N.Y.: Feb 26, pB.1.
[29] *Oxford English Dictionary Online*. URL: http://www.askoxford.com/. Last accessed: 1 June 2005.
[30] Barth, Steve (2002) 'The Organic Approach to the Organisation: A conversation with KM practitioner David Snowden,' *Knowledge Management*, Monday, September 11, 2000. URL: http://www.destinationKM.com/articles/default.asp?articleid=764. Last accessed: 1 June 2005.
[31] Ibid.
[32] Ibid.

Daft Comparison[33]

Mechanistic	Organic
1. Tasks are broken down into specialized separate parts.	1. Employees contribute to the common task of the department.
2. Tasks are rigidly defined.	2. Tasks are adjusted and redefined through employee teamwork.
3. There is a strict hierarchy of authority and control, and there are many rules.	3. There is less hierarchy of authority and control, and there are few rules.
4. Knowledge and control of tasks are centralized at the top of the organization.	4. Knowledge and control of tasks are located anywhere in the organization.
5. Communication is vertical.	5. Communication is horizontal.

Ecology spawned the organic organisation idea. Ecology is the study of all interactions of an organism with other living organisms and with its nonliving environment. Interactions between organisms and their environment are two-way processes: organisms both influence and are influenced by their environments. Ecological food-webs form multiple dendritic branches as interactions and interrelationships become more complex. Ecological systems are complex and constantly in a state of flux with no 'endpoints.' Change is the only constant for ecological systems. Within nature, truly successful ecological communities are those that are adaptable to ever-changing environmental and biotic conditions. Change is evident daily and moment-by-moment in the natural world. When unexpected environmental extremes occur (e.g., floods, fire, food shortages, predators, harsh winters and summers), only adaptable individuals and communities survive.

When organizations face severe threat from dramatic environmental change they often loosen their hierarchical, bureaucratic structure to operate more organically. Richard Daft summarizes Tom Burns's and G. M. Stalker's findings on the effect of the external environment on the internal organization of 20 English industrial firms. When the external environment was changing, internal organization was looser and more free-flowing and adaptive; the converse was true when the environment was more stable. Stable external environments produce more mechanical organizations; i.e., formal, written rules and procedures and centralized hierarchies of authority and control. In contrast, rules in organizations in rapidly changing environments were often not written; if they were, they were frequently ignored. Delineated paths were not laid out; individuals had to make their own ways. It was not always clear who was in charge, and decisions were made closer to the action rather than centrally. Burns and Stalker described such organizations as organic.[34]

Roger Lewin and Birute Regine believe that as organizations encounter greater complexity they will adopt organic approaches to management; that is, they will function as "complex adaptive systems."[35] From their ethnographic studies of many companies, they conclude that companies respond to their environment, change and innovate most effectively, when they value "authentic relationships" and emphasize nonlinear styles of work. The most effective leaders tolerate the paradox of leading by not leading. To manage an organization as a complex system means that leaders have to learn to let go of control. They cite an English executive who learned that relationships are necessary to manage nonlinear processes. Pertinent to our concern about the silo bureaucracy, this leader said, "If you work within boxes, it's easy, *because it's not about people*."[36] (emphasis added). Lewin and Regine summarize the importance of relationships in managing complex systems as follows:

> In other words, when relationships became the means for guiding nonlinear processes, leaders had to see the limits of their control, which was not an easy task. Instead they focused on the power of the interconnected world of relationships and the feedback loops they foster and feed. This makes sense from a complexity perspective because it is through interactions—that is, relationships—that something novel emerges. How people interact, whether they have a mutual effect on each other, influences what emerges, negatively and positively. By focusing on relationships, these leaders began to

[33] Daft, op. cit., p63.
[34] Daft, Richard L. (2001) *Essentials of Organization: Theory & Design*, South-Western College, p63.
[35] Lewin, Roger and Regine, Birute (2000) 'An Organic Approach to Management,' in *Issue 4: Growing the Adaptive Enterprise*, The Cap Gemini Ernst & Young Center for Business Innovation, p19. URL: http://www.thesoulatwork.com/pubs/orgapp.html. Last accessed: 1 June 2005.
[36] Ibid., p20.

> see their organizations more organically—as interconnected human webs, living organisms that unfold and adapt. On this new ground, the workplace had become an experiment in progress.[37]

Organic systems are complex adaptive systems. Richard T. Pascale, Mark Millemann, and Linda Gioja describe them as systems of "independent agents that can act in parallel, develop 'models' as to how things work in their environment, and, most importantly, refine those models through learning and adaptation."[38] They identify four complex adaptive system principles that bring about change in social organizations:

1. When an organization is in equilibrium death is knocking at the door.
2. When faced with death, organizations quiver at the edge of chaos which stimulates "mutation and experimentation."
3. Such excitement causes the living system's independent agents to "self organize" resulting in new organizational patterns and processes.
4. Organic or complex adaptive systems cannot be designed linearly; rather, disequilibrium stimulates self reorganization or change.[39]

Consequently, informed managers do not attempt to redesign organizations from the top down. Instead, they allow or even induce disequilibrium to cause the independent agents within the complex adaptive system to self-reorganize. "In an era when change arrives without warning and threatens to eradicate entire companies and industries overnight, organizations can survive only by engaging the eyes, ears, minds and emotions of all individuals and by encouraging them to act on their knowledge and beliefs."[40]

As the merit-based bureaucracy was an improvement on the king's court organized around family and personal connections, and as the horizontal system based on effectiveness is an improvement on bureaucracy, we believe that organic systems can come nearer to optimizing their performance than horizontal systems. Or to put it a little differently, horizontal systems reach their optimum effectiveness and efficiency when they function as organic systems or complex adaptive systems.

5.1 Organic System Advantages. For a number of reasons, an educational organisation in the 21st Century may be more analogous to an organism than to a machine. Machines are designed for a specific purpose and can be adapted to new purposes only by being rebuilt. But organisms are designed to adapt to changing circumstances. Machines are atomistic: they are constructed of small parts put together in a pattern that constitutes a new whole. Organisms are holistic: the whole organism generates the parts, which are fully integrated. Living organisms behave in ways that educational organisations would do well to emulate; that is, undergraduate learning programmes can approximate living systems in their design and behaviour. The following characteristics suggest why the organic analogy may lead to better educational organisations.

(i) *Healthy cells are selfless*. Deming describes the obligation of a component of a system as follows:

> The obligation of any component is to contribute its best to the system, not to maximise its own production, profit, or sales, nor any other competitive measure. *Some components may operate at a loss to themselves in order to optimise the whole system, including the components that take a loss*.[41] (Emphasis added)

Beyond the general influence of American culture, the American academy particularly reinforces individual competitiveness. Individual faculty members are recognised and rewarded for disciplinary scholarship and research. Time and talent devoted to teaching and service to the institution are not rewarded to the same extent as scholarly contributions to one's discipline at a national or international level. Hence, faculty members are rewarded for their individual work rather than teamwork and for international, disciplinary accomplishments rather than for institutional, cross-disciplinary contributions. It is interesting to note that in the sciences, faculty members often collaborate in their research but teach as loners. Consequently, the faculties of prestigious universities are composed of individuals who succeed nationally and internationally in disciplinary research and scholarship. While such institutions can deploy powerful learning technologies, they can rarely sustain long-term collaboration on systematic improvement of undergraduate learning. Their collective minds are elsewhere.

---

[37] Ibid.
[38] Pascale, op cit, p5.
[39] Ibid., p6.
[40] Petzinger, op cit.
[41] Deming, *The New Economics*, op. cit., p100.

It is the essence of the organic organisation that the cells, the functional units, are animated and motivated by a vision of the whole purpose of the organisation rather than a narrow role defined by the structure of the organisation. Many of the great innovations in the history of technology and business have emerged from completely 'inappropriate' places, employees acting completely outside the hierarchical loop, teams or 'skunk works' motivated by the need to solve a problem that it was nobody's job to solve. When the organisation moves quickly to address a need or respond to environmental changes because the parts are ignoring territoriality and acting in the interests of the whole, it is acting as a living organism.

(ii) ***Synergy***. Silos separate; they make interdisciplinary flows the exception rather than the norm. Deming describes a system as "a network of interdependent components that work together to try to accomplish the aim of the system."[42] Phil Phenix, a former professor of philosophy and education at Columbia, says that new ideas come from the intersection-overlap of at least two disciplines.[43] Scholarship and research are advanced by ecological interflows rather than silo isolation. Students will learn more and more deeply if they move through a rich, nourishing cognitive ecosystem, not a rigidly compartmentalised set of isolated boxes. Learning is an organic process precisely in the sense that it thrives on the synergy of connection.

We learn by making connections. Analysis requires synthesis. The growing differentiation of understanding can persist only when we generate new categories freely and abundantly. But new categories emerge from the comparison, overlapping, and analogising of existing ones. The cognitive ecosystem in which learning thrives is one in which the cross-fertilisation of ideas continually replenishes the thoughtful search for understanding. A balanced ecosystem senses environmental changes and adapts more quickly and effectively than a mechanistic organisation. Such a balanced ecosystem of individuals and units working together depends on a culture of trust. An organic culture lives on trust, which reminds us of the eighth of Deming's 14 points: "Drive out fear, so that everyone may work effectively for the company."[44]

(iii) ***DNA Over Mission Statements***.[45] The first of Deming's 14 points for improvement of quality in the U.S. is constancy of purpose to improve. When he lists the Seven Deadly Diseases of American industry, the first one is "the crippling disease: lack of constancy of purpose."[46] U.S. higher education accrediting associations emphasise mission statements because they attempt to evaluate institutions in terms of their missions. Yet, university mission or purpose statements are usually worded broadly and vaguely to encompass any and every opportunity. And the espoused mission of an institution is seldom enacted. The mechanistic organisation structured into vertical silos is seriously disabled when it comes to enacting this principle. But even a horizontally integrated mechanistic organisation is disabled here because the boundaries of improvement are set in advance.

There are a few institutions where the purpose, design, or plan seems to be in the drinking water. By long tradition, commonly shared but distinctive values and purposes persists in these institutions. These inter-subjective, not necessarily explicit, agreements are like DNA. The plan or purpose permeates the community and is part of the mind and heart of faculty and staff. The ability to cope with change is proportional to the depth of community in an institution. Where there is widely and deeply shared inter-subjective agreement, there is little need for formal mission statements to discipline choices and set direction. Where inter-subjective agreement is absent, it is difficult to develop community through compelling mission statements or elaborate strategic plans.

On the other hand, close-knit groups can explore uncharted paths; an institution that is truly a community can respond with agility to opportunities without being encumbered by elaborate written and formal goals and plans. They are also more able to reflect on their collective behaviour and performance with a minimum of assessment scaffolding. It is kids'

---

[42] Deming, op. cit., p98.
[43] Personal communication, 1975. (Identification by the Princeton Alumni Weekly's epitaph) PHILIP HENRY PHENIX '34 "He graduated summa cum laude in mathematical physics at the age of 19 and won our class's Outstanding Achievement Award. … Prior to his retirement in 1982, he was a professor of philosophy and education at Columbia University. The Class of 1934." URL: http://www.princeton.edu/paw/archive_new/PAW02-03/06-1204/memorials.html. Last accessed: 1 June 2005.
[44] Deming, *Out of the Crisis*, op. cit., p23.
[45] DNA. Encyclopedia Britannica. 2003. Encyclopædia Britannica Online. May 14, 2003. URL: http://ezproxy.samford.edu:2084/eb/article?eu=31232. Last accessed; 1 June 2005.
[46] Deming, *Out of the Crisis*, op. cit., p23, 98.

stuff: "When you go out into the world, watch out for traffic, hold hands, and stick together." (From Robert Fulghum's *All I Really Needed to Know I Learned from Kindergarten.*)[47]

(iv) ***Stem Cell Faculty and Administrators***.

> A stem cell is a cell that has the ability to divide (self replicate) for indefinite periods—often throughout the life of the organism. Under the right conditions, or given the right signals, stem cells can give rise to (differentiate) the many different cell types that make up the organism. That is, stem cells have the potential to develop into mature cells that have characteristic shapes and specialised functions, such as heart cells, skin cells, or nerve cells.[48]

Viable institutions have 'stem cell' members who move easily from one role to another, connect past, present and future, and assemble new structures where old ones are crumbling. They embody the institution's ethos and are multitalented. They are generally more attached to the institution and its primary stakeholders than to any national network or specialty. While most organisations have formal organisational charts, the actual work gets done through informal networks.

(v) ***Flux sustains***.

> Substances have to pass through the cell membrane in order to enter or leave it. Oxygen and nutrients have to enter the cell and carbon dioxide and other waste products need to leave the cell. If this transport does not occur, the cell would run out of oxygen and nutrients and waste products would build up in the intracellular fluid.[49]

As an organism's life is sustained by the flux of nutrients among cells, so are true academic communities sustained by continuous, fluid interrelationships among faculty, students, staff, and administrators. Cells have walls, maintain their individual integrity, but those walls are permeable, open to the whole, conducive to the exchange of value. And this happens across the permeable cell walls of the organic institution. But the cell walls of the organic organisation can maintain their integrity and their permeability at once only when they are not calcified and hardened by the defensive expectation of invasion. The flow of feedback within the organic system allows the parts to continuously adjust and adapt. The organic organisation grows, not just in size, but in adaptability and capacity.

6 Looking Ahead

We began with this question: Can higher education institutions as presently organised on the model of research universities effectively and efficiently deliver national, mass, postsecondary education? If we answer that question in the negative (and we do), then it will be clear that the organisational structure of most existing universities poses a barrier to achieving the central tasks of undergraduate universities. Form obstructs function. And the current silo form of universities, because of the loose and largely formal coupling of the units, also obstructs institutional change to address these formal barriers.

The national and international needs for postsecondary education cannot be met by institutions built on the organisational model of the research university as a collection of disciplinary silos. The silo-constituted university emphasises disciplinary research and scholarship at the expense of undergraduate education. In general, bureaus composed of separate departments poorly facilitate navigation across organisational boundaries to achieve core functions. They are designed not to serve those who need their services but to protect the territory and advance the research of the specialists within them. Organisational stakeholders and clients have a right to expect seamless systems. Components of service, health, and educational systems add the most value when they maximise their contributions to the overall system through seamless integration with other organisational components. If a unit is preoccupied with its own success with little regard for its contribution to the system, it sub-optimises the system.

While universities are organised as collections of silos, the collection is loosely coupled. Loosely coupled units retain their respective identity and separateness. As Karl Weick points out, "Loose coupling also carries connotations of impermanence, dissolvability, and tacitness, all of which are potentially crucial properties of the 'glue' that holds

[47] URL: http://www.geocities.com/Athens/Acropolis/4994/mind/state/kinder.html. Last accessed: 1 June 2005.
[48] Stem Cells: Scientific Progress and Future Research Directions. Department of Health and Human Services. June 2001. URL: http://www.nih.gov/news/stemcell/scireport.htm. Last accessed:1 June 2005.
[49] Wong, May, Edward Hettiaratchi, Gautham Jayachandran, Ian Cathers 2001. URL: http://www3.fhs.usyd.edu.au/bio/homeostasis/Movement_of_substances.htm. Last accessed: 1 June 2005.

organisations together."[50] Loose coupling is the saving grace for change in universities and has served institutions well in achieving specialised research goals. In many cases, a department may respond quickly to grant opportunities or new research directions in the field without consulting the rest of the organisation. However, while loose coupling facilitates local change, it also limits its scope. Universities are always changing incrementally, but the change tends to be constrained to the loosely coupled silos:

> [C]hange in loosely coupled systems is continuous rather than episodic, small scale rather than large, improvisational rather than planned, accommodative rather than constrained, and local rather than cosmopolitan. … Change diffuses slowly, if at all, through such systems, which means that components either invent their solutions—which may be inefficient compared to other solutions available in the system—or they die. [51]

Traditional educational organisations, as Meyer and Rowan have pointed out, are tightly coupled through the ritual classifications that create the façade of organisational integrity. But because these ritual classifications are almost completely uncoupled from outcomes or work processes, they tend to be forms with little leverage on functional operations. So nearly every university can report in detail how many students have completed how many classes, receiving how many grades, resulting in how many degrees granted. But very few universities can report even what pedagogical practices faculty use in teaching the classes, much less what or how much students learned by the end of the term or what students can do as a result of the experience. Any university can report how many students have completed the general education or breadth requirements that are a condition of the degree. Few or none can report whether the courses a given student took were coordinated in terms of addressing a common skill set or knowledge base. It is fair to say that the coupling of units and events at most universities is formally rigid and functionally incoherent.

To adopt a more horizontal organisation, universities would have to create functional linkages among the units based not on ritual classifications but on student experience. It is difficult to do that, precisely because the loosely coupled units have little leverage on each other except at the formal level of ritual classifications. Given its loose coupling, the university, especially in the organisation of undergraduate education, will be slow to adopt aspects of horizontal organisation. Its formal integrity rests on the logic of confidence that defers to form over function that assumes — based on blind trust—that form reflects function. But that logic is increasingly doubted, and loosely coupled organisations are vulnerable when their logic of confidence is in doubt. As Weick notes, "The introduction of doubt into a loosely coupled system is a much more severe change intervention than most people realise. Core beliefs, such as the presumption of logic and the logic of confidence, are crucial underpinnings that hold loose events together." [52]

In response to the growing doubts that undermine the logic of confidence, many institutions are moving toward ambidexterity, by creating cross-disciplinary capacities to connect organisational units for functional purposes. Institutions that can use their teaching and learning centres, their advisement and counselling processes, their learning communities, or their institutional assessment systems to couple departments and other units around functional student learning goals can begin to move toward horizontal organisation. Perhaps those that have the best chance of doing so are institutions that have little or no research focus or that can draw a bright line between faculty research and undergraduate teaching. In many nations, some private institutions have more flexibility in this regard than public ones; for-profit universities may have more flexibility to reorganise for results. Institutions that have used technology to break out of the box of the classroom have had to construct new feedback loops as a substitute for the logic of confidence, which may not be extended outside of the conventional campus. New institutions that seek to pioneer organisational change are creating new models.

Conventional universities will face the greatest challenge. For the past half-century or more the main challenge to the traditional undergraduate university has been to grow in size, to serve more students in the same formal framework. But this is changing for several reasons, among them changes in the student population, changes in the needs of the economic system, new technology, and competition. Today universities are increasingly called upon to prepare more students, but less 'traditional' ones, and to prepare them for sophisticated work in a rapidly changing environment. At the same time, data communications and computer technologies have advanced to the point where real-time, interactive communication is possible at great distance, freeing education from its bondage to the classroom and opening up education to an even greater number of potential students. These developments have given rise to an unprecedented

[50] Weick, Karl (1976) 'Educational Organizations as Loosely Coupled Systems,' *Administrative Science Quarterly*, Vol. 21, p3.
[51] Ibid., p390-391.
[52] Ibid., p392.

need for universities to adapt and improve. At the same time, public universities in most of the world are still locked into funding formulas and bureaucratic rules that assume the continuation of present practices. While facing a growing range of competitive institutions, many of them ambidextrous or incorporating major features of horizontal organisations, the university seems tied to the past.

It is true not only in higher education but also in all the realms of technology, culture, and the economy that predicting the future with any precision is a fool's errand. We have entered an era in which the only thing we can expect with confidence is the unexpected. Will universities learn? Will they organise their enormous resources to optimise value and rise to the challenge of continuous improvement? Of course, we do not know. But what seems very likely is that this race will go to the swift, that the organisations that can learn to adapt most quickly will thrive, and those that cannot will languish or die.

Our discussion of the organic organisation was fairly brief. The reason for this is that we have few fully developed models, few examples of educational organisations that are truly organic. But we believe that those who are shaping the future of higher education should reflect carefully on the organic model. The thing that differentiates it from the horizontal, mechanistic model is that it learns and changes faster. The horizontal organisation is driven by defined goals, while the organic organisation can respond to emergent needs. It has its defined purposes, to be sure, its chosen functions. But it is alive to the possibilities of growth in unexpected directions. The organic university is an ongoing experiment. The new student, the new job category, the new discipline, the new questions posed by the society or the economy become hypotheses to be tested and avenues to be pursued. The organic university is awake to the possibilities of the future, so it is the university most likely to thrive in that future.

Looking back at the major universities of a half-century ago, while we can observe many differences of detail, the overall system is strikingly similar to what we see in most universities today. If we attempt to imagine the university a half-century from now, there is only one assertion we can make with confidence: the overall system will be strikingly different from what we see today. What the differences will be we cannot predict with confidence. But perhaps we don't need to. Perhaps the most important thing to know is that they will be very different. Faculties and administrators in higher education are exceptionally sensitive to, and dismissive of, fads and fashions. They have seen them come and go. A certain amount of this scepticism is healthy, but too much of it could be fatal. The movement from the vertical silo, to the horizontal organisation, toward the organic university is not a fad. One way or another, it is the future. What the world calls for is a human organisation that can meld constancy of purpose with responsiveness to change, one that exhibits the integrity and flexibility of a living organism. We do not know precisely how to get there. But we know beyond doubt that we cannot get there by staying where we are.

