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ABSTRACT

That William and Mary is a small, traditional, liberal arts college does not exempt it from the need for interdepartmental coordination, efficient allocation of resources, and accountability. In conjunction with the International Business Machines Corporation (IBM), the college undertook an extensive probe into information networks to see if the institution's demands for information, data processing, and planning could be supplied by an IBM system. A six-man team of college staff and IBM personnel conducted interviews and collected data attempting to spell out the administrative processes and information flow required to supply leadership with more perfect information. It was found that the information flow was poor, restricted by departmental provincialism. The development of an institution-wide, computer-based system was recommended. (EMH)

Transition to Information Systems at a Liberal Arts College

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Denver, Colorado

I am pleased to be with you, to represent President Graves and The College of William and Mary, and to give this paper. My topic has to do with the experience of one small institution trying to cope with the potentialities of information systems. I have divided my presentation into four parts: why we decided to move in this direction; how we went about it; what to date we have gained from our experience; and where we think it has taken and will lead us, and why.

I am not a professional in this business. I have been associated long enough and closely enough with the world of information systems, however, to know that key educational administrators depend on good information to make good decisions and wonder why they do not get it; and that data processing managers do not always know what information to give administrators because they, the administrators, do not always appear to know what they want. These are precisely the questions involved in William and Mary's experience as I hope to relate it, and it is to them that I hope to speak.

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First, a word about William and Mary. The College in many ways represents the epitome of what the liberal arts college in America tries to be. We have been, and are known, as a small, very old, reputable institution, having an illustrious history dating to the Revolutionary Era, a strong faculty, traditional curriculum, high calibre student body, beautiful campus in quaint surroundings, and conservative outlook. Time, if you will, is on our side.

The College's mission remains well defined for the foreseeable future: we have been, and continue to be, a high quality, residential school that seeks to offer a first-rate liberal education, in breadth and depth, primarily at the undergraduate level. In recent years, however, the College has grown into modern university status. We have three professional schools now--in Business, Education, and Law--and we are considered to be a prototype of the modern mini-university. Today we have about 6,000 full-time students, 1,000 of them graduate and professional students; a faculty of 450; four doctoral programs; and a variety of offerings at the Master's level. Our undergraduate program, though, remains primary to our mission.

Despite William and Mary's "purist" image, there are a number of anomalies about the College. The College has long and strong Virginia roots, but it also has a strong national history, flavor and composition. It is a state institution, with a highly private background, character and outlook. It is a public institution but a relatively small one. It emphasizes excellence when public education is stressing access, restrictive admissions when our demand pool remains very strong, and a policy of little or no growth when the economics of growth are a formula for survival for many schools. Although once a private college that made a strong contribution to leadership and public service in the nation, and in more recent years a state institution which has given birth to and mothered several other sister institutions in Virginia, we offer virtually no continuing education today. Our establishment origins, as well as strong footing in time, would suggest that our alumni body is wealthy and our endowment somewhat large, but neither is true. Finally, --and a product of the inability of the past to be divorced from the present--the College

today has all the administrative overhead and complexity of a university, but consciously (or unconsciously) strives to retain its identity and preserve the atmosphere of a smaller, more sequestered institution.

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Our interest in information systems developed out of external and internal pressures we face as an institution. We have our share of problems that are common to all institutions. We feel the constant overhang which derives from the complexities of coordination and the labyrinth of rules and regulations attendant to it. We know the pressures of accountability--of justifying what we want, and of defending what we need. We also understand how allocation of new resources has given way to reallocation of existing resources. These trends, which we all face, add up to a revolution in the management of higher education which Earl Cheit, I believe, puts best:

> "Under steady-state conditions, the methods of management are having impact on organization. Planning models, or even simple exercises to develop goals, bring to the fore certain objectives that had been assumed but never made explicit. Now they must be not only revealed but also defended. Without growth, the interdependence of decisions cannot be ignored or left to be absorbed by future changes. The method of change becomes substitution or even contraction. This squeeze places great stress on choice. Decision points become more formal. Criteria for judgment are more often those that are measurable. In short, the basic questions of goals, governance, allocation of funds, and measurement of results now are coming within the influence of management methods whether folk or system."* (Chart 1)

The external realities have been matched by internal realities. Our recent accreditation study, a ten-year review and report, advocated a look

*Earl F. Cheit, Program Officer, Division of Education and Research, the Ford Foundation, Education and the Steady State, p. 155.

at information systems. There were internal pressures calling for a better use of critical resources: energy inflation is just one. The President needed more and better information generally, if he was to be able to see the future in a more orderly way. After it was determined that we would forego the search for a Vice President for Planning and Administrative Services due to a personnel freeze, it was agreed another kind of effort would be necessary to deal with the problems of institutional data management. And when the opportunity came along to do a study, the timing seemed right.

One might say that higher education, for the first time, at William and Mary and elsewhere, is being defined, and that the defining is being done through the medium of information.

Last year, therefore, the College undertook an extensive probe into its information network, in conjunction with the IBM Corporation, as external and internal circumstances and events converged. Its purpose was threefold: first, to define the institution's information wants; second, to diagnose and assess our administrative data processing operations; and third, to link the first and second purposes into a program that could establish priorities in the information field, provide some overall direction for us, and create a better interface between the needs of administrative staff and data technologists in the use and supply of information in an economical form and format. Our goal was not to develop an information systems program in detail at this point; but to document our information needs; to see what direction they posed for us; to propose a first system for development; and to lay out a comprehensive plan for the successive implementation of

other systems.

We went with IBM for a number of reasons. They offered the service to us, and we needed it. We were "babes in the woods," and their professional counsel and guidance was a welcome resource and dependence for us. We did not have the staff to spare, nor the expertise at hand, to go it alone. Out-of-house capability, we thought, could avoid in-house mistakes--and time.

Most of all, their concepts appealed to us. There were two key concepts involved. They formed the core of the study. One was to define systems by "processes" at work, not the organization carrying them out. With organizational changes a dime a dozen in colleges and universities, as elsewhere, the concept of processes seemed to us to be a more durable basis than organization for sound future planning. The other concept involved construction of information systems according to a "top-down" information hierarchy, not a bottom-up information capability. Although the definition of information systems from the top-down is controversial in the literature, it made sense to us. The top, not the bottom, needs information, asks for it, and makes decisions on it. The top was not getting the information it needed. The top, not the bottom, has responsibilities for giving leadership to administrative data processing and for making decisions about computer hardware and the cost of computer services. It is the top, moreover, that is the link to governing boards and state systems, where most of the pressures are being generated and move downward. (Chart 2)

In addition to the concepts, we liked the approach that IBM used with us. They provided the methodology and research framework to do much of

the technical assemblages for our study. But it was our study, not theirs. IBM provided the structure, we the content. The processes would be our processes, and the matrix of their interaction, our matrix. Our administration would define what its information needs happened to be. By these two means, we thus would form our own picture of ourselves, first, in terms of the processes as they were, and second, in terms of the College's educational goals for the future, as the administrative and academic leadership of the institution understood and wished them to be. The study was sufficiently ambitious to involve the entire energy of the institution, but sufficiently modest in its goal of achieving a master definition rather than a master plan. It was all very exciting, I must admit, and good therapy for an institution that has little disposition toward and for change--indeed is guarded about it.

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As we went into the study, our preconceptions were few. We knew that our institutions generally are threatened today for the lack of viability. We knew that they can rise or fall on the basis of good or bad decisions coming, in large measure, out of good or bad information. We knew also that organizations often duplicate information and almost always complicate, rather than simplify, the job of distilling it. We were aware of management information systems and that higher education was behind the times in relation to the computer hardware capability it possesses, in using them. We know management is a "dirty" word in higher education and that nobody in a

college or university, least of all faculty members, want to be managed or feel they need to be. We believed at the same time that it is generally expected, among faculty especially, that a college of our maturity should run well. Finally, we knew a problem faced us: we needed, in short, to have more structure and less chaos in the area of data delivery.

We had some immense advantages we could not overlook. Our computer resources, we felt, were excellent. Our data base, we felt, was and is far and away ahead of that of most institutions our size. We were and are blessed with a President who is a superb administrator and whose field is the management of higher education. He is a President, therefore, sensitive to the needs of management of higher education. Our environment operated, in one sense, in our favor. As a no growth institution with a resource base that is fairly fixed, we felt our future was a little more calculable. Our administrative structure, finally, is simple and clean. We were undertaking to study a big organization, but not one that is terribly unwieldy.

We also had some limitations. In a small institution, it is especially difficult to spare administrators for a lengthy study. We are not full of assistant vice presidents or vice chancellors, and the manpower sacrifice consequently is somewhat greater. It is doubly hard to add administrators in a small institution, particularly if an information systems program happens to require, not simply a new administrator or two, but a whole cost center. Third, there is greater visibility in a small institution about decisions which get made. As a relatively small one, our study undoubtedly would have wide and careful scrutiny within the institution before any moves were

made. It therefore had to be done well, or probably not at all. Finally, in small institutions, attitude sensitivities are greater. This is probably due to a higher sense of community which prevails in this type of environment, as well as to the stronger operation of the collegial principle of decision making. Consensus, at any rate, is more critical to obtain, and it is also harder to get. One must be extremely sensitive as a result, not only to what is done, but who does it, how decisions are reached, how they are communicated, and to whom, when, and how.

During the study, our task was threefold. The first, and most important task ahead of us, was simply to get the job done. The study process was a crash undertaking. For seven weeks, we virtually dissected the College. The study team, consisting of 4 people--two from the College, and two from IBM--closeted themselves for these seven weeks, three of which were devoted to the study and four to the evaluation and writing of the study report. Those who were deployed to do the study gave it their undivided commitment as other assignments and duties were put aside. Within the institution, the study had highest priority.

The team concept worked well. There was a good division of labor. The two IBM representatives kept us on time. They made us stick to the methodology closely. And they did most of the supportive technical research--with, of course, complete cooperation and help among those on the staff at William and Mary asked to help the team with its investigations. The William and Mary representatives, on the other hand, helped translate the methodology into the William and Mary environment. They interpreted that environment carefully as it bore on the study's findings, and they ensured that the direction

and momentum behind the study did not lose touch with the assumptions and values which underpinned the College's environment as an academic institution.

The IBM representatives were obviously picked with great care. The two of us, myself and Mrs. Nell Jones, Assistants to the President and Vice President for Academic Affairs respectively, were staff people. We also were chosen with careful regard to our roles. Besides being in a better position to be released from other duties, our selection was important in achieving representation from the College at the institutional level. Once the study got underway, Mrs. Jones and I had our own division of labor. Our roles were highly complementary. She, a trained statistician who deals daily in the complexities of enrollment, faculty, class schedule, and space inventory counts, interfaced with the data findings of the study. My role was less specific. It certainly, in part, was designed to keep the President's Office closely identified with the study; to keep the President himself closely informed about its progress; and to bring to bear on the study the President's leadership style and approach to problems at every point possible. In addition, my job was to interface organizationally between and among academic and administrative divisions of the College. We also, I might add, utilized the services of a member of the staff of the Office of Institutional Research, in a secretarial and supplemental administrative capability. There were day-to-day logistics in organizing the study, and these were the responsibility of Mrs. Willa Chambers.

The study team did not perform its work alone. It occasionally drew upon the labors of others within the College. The Director of the Office of Institutional Research coordinated the work of this group, which consisted

of one representative from every line sector of the College. Since Mrs. Jones and I were in staff positions, it was important that our participation not be considered a substitute for the participation of those who had direct line responsibilities for college operations, or who could represent those having these responsibilities. If we had not followed this procedure, the role we played would have been, necessarily, minimal. We were picked for our perspective, not for our perspicacity in speaking for others who were directly in charge of the College's functions.

If our first aim was to get the study done, our second was to do it within the framework and values governing the institution. We could never forget, for example, that our object was not management for management's sake, but management for the sake of the academic and educational purposes of the College. This was especially important to emphasize with faculty and deans. We reminded ourselves constantly that inputsto the educational process may be able to be measured quantitatively, but that outputs could not. We tried to indicate, especially to faculty, that failure in the future to administer resources well was likely to involve a high opportunity cost, and that the educational program of the College would suffer because of it. We emphasized to ourselves, and again to faculty, that there would be a constant tradeoff between time, cost, and quality in information systems, and that progress was not going to come without some dislocation and, at times, disequilibrium.

With administrators, it was equally important to emphasize some things. We struck hard at data provinciality, and the problems it was creating for us. We stressed that data should not continue to be a depart-

mental resource; it had to be a College resource. We tried to communicate that the computer itself was a resource being vastly underutilized. Finally, we reaffirmed that organizational perturbations were not at issue, and that what was at issue was how elemental processes could better support existing organization. These reassurances were educative, and they helped.

Our third task was to link management's needs with the needs of our administrative data processing organization. This was accomplished primarily in two ways. First, we conducted an exhaustive review of our data processing resources and how they were operating. This involved taking a look at the numbers of users of the computer for administrative support; the degree of their dependence on the computer's resources; the kinds of data processing operations taking place; the level and kinds of manual operations being done across the College; the proportion of data processing resource going into maintenance versus developmental applications; an examination of schedules, their predictability, and the workloads undertaken by our Computer Center; and the kinds of input into our administrative systems office, such as on-line or batch inquiries.

Second, we interviewed at length each Vice President of the College, all the Academic Deans, and most key administrators at the College. We conducted in all 16 structured two-hour interviews. The interviews, compressed into a week's time, resulted in an outpouring of a wealth of information having to do with information wants and needs, planning goals, administrative priorities, and data frustrations. The questions were hard-hitting, and the answers in all cases strictly confidential. If nothing else had been achieved, the study would have been invaluable because of the interviews.

Aside from the information they elicited, they ensured wide participation in the study, control and direction of the framework and results of the study, and the basis for arriving at our findings, conclusions, and recommendations.

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Our findings, conclusions, and recommendations are of interest, and they are communicated fully in the report we printed about the study.

The findings are simple to summarize. We identified our basic information flow problems (Chart 3). From the interviews, and based upon supportive research, we found that the flow of information, horizontally and vertically, was essentially a poor one (Chart 4). We also found that there was a maldistribution of administrative data processing resources at the College (Charts 5 and 6). In the form of a matrix graph, we were able to document how these findings looked in print (Chart 7). The diagnostic results provided a snapshot we badly wanted and very much needed.

The conclusions were not really surprising. In some cases they confirmed existing impressions, and in all cases offered new insights. They covered a wide degree of administrative consensus, and they probably in a number of cases apply to other institutions as well. We realized, first, that we had no overall data strategy. We found a high degree of data provinciality to be at the root of the problems we were experiencing in accuracy, centralized access, redundancy, and timeliness of data. We found a lack of accountability for data. The time lags in getting it, in the proper

form and right timeframe, were too great. Finally, there were too many manual operations taking place.

Our key recommendation was that the highest possible priority be given to an information systems program. We also recommended expanded administrative use of the computer, the adoption of a fully integrated data base, and the assignment of leadership to the implementation of an information systems program at the institutional-wide level. We specifically recommended the hiring of a Director of Administrative Resources who would establish administrative computer priorities, define data accountability, establish audit guidelines for data, and institute an education program on the uses and responsibility for data. Finally, we identified the first and second systems to be developed, the first being a student system, the second a financial system.

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At the College of William and Mary, we have now finished an information systems plan and have begun the implementation of an information systems program. While the brunt of our work lies ahead for us, the process of defining what we need to do has had an important bearing on getting the job done.

We think we have made the initial transition well. The fact that we have made the transition at all is probably worth something. There have been other benefits, however, to come from the study we have done. The

total immersion the study required has brought about institutional direction. We feel we have obtained a sense of what we are doing, a time period for doing it, an approach, and a program. We have hired a Director of Administrative Information Services who has become the focus of our implementative efforts.

Our broad priorities in information systems are now set forth. The student system, our first, has been selected for a variety of reasons. It is quickest to put into operation; it touches the most people; it influences our revenue projections because it drives our budget; it therefore is the key to a financial system, which is the critical one for us.

As a result of having priorities for the first time, the central administration has become involved, and has taken responsibility, in an area it had long neglected. The link between management priorities and data processing priorities has also been made. Most of all, the study has sharpened our understanding of ourselves. It has helped us recognize that we are both an educational enterprise and a bureaucracy, and how we are each of these.

For a select institution whose role involves transmitting the cultural heritage, it is important to be sure that our primary functions, teaching and research, are maintained and that our character, or that which we hold most dear, is protected. We feel a need to know more perfectly how to deal with our uniqueness as we move into a new sphere of coercive comparison. As a state institution, we are conscious of the importance of a high degree of resource management and conservation. As a small teaching institution, we know we must watch the costs of our labor-intensive industry.

As a steady-state institution, we must deal with forces that are trying to turn us into a college, not of the exception, but of the rule. We need also to know how the rampant growth for information to support these objectives should flow in an institution like ours: how as a small institution we can handle the burgeoning demand for it, and how what we produce or do not produce relates, more basically, to our health and preservation in the future. We perceive information, then, as playing a critical role for us.

It has been said that every college or university has a management information system, whether or not be design. We knew we had one that was not by design, and we had a pretty good feeling that it was not working well. We knew it needed to work better at a time when information was having a lot to do, for the first time, with how higher education is put together.

For the small college watching each dollar and the large university seeking to control its organization, information systems undoubtedly have value. For us, the mini-university, the issue is also the extent to which we will continue to be run by folk or systems methods. In deciding to make the transition from folk to systems methods, an equally paramount concern in our case, the one I have tried to stress most, is the importance of how one gets there. In higher education, the line between the means and end still needs to be drawn.

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