



# Information Resources Development Challenges: A Case Study at the University of Guam

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## INTRODUCTION

Information Resources Development is a new frontier for many organizations in Asia Pacific Country. While capital investment for information technology remains as a major challenge, management must overcome organizational inertia and the general deficiency in information literacy.

The University of Guam began the investment on a campus-wide information system in the early 1990. The purchase of a popular Data Management System (COLLEAGUE) for higher educational institute initiated the computerization of many internal operations. A Computer Center was established to handle the general system maintenance and technology acquisition. The registrar office, business office, and financial aid office were among the first to computerize their operations. Some of the initial benefits include a telephone registration system, electronic payroll deposit, a text-based email system and the availability of many standard management reports. In the mid-1990, the installation of a campus-wide fiber optics communication backbone positioned the university as a major Internet Hub in the Western Pacific, and stimulated various data communication developments including Intranet capability, and distance education. However, there is still a lack of planning data after one decade of technological development, and information resource management is still a new concept to managers. This paper will first present issues and challenges in information resources management, followed by challenges in information resources development.

## ISSUES IN INFORMATION RESOURCES MANAGEMENT

### The Dilemma Of Dual Processes

The implementation of a turnkey system seldom satisfies the localized needs of users. In the case of the telephone registration system, a staff-assisted registration process was retained to accommodate students who chose not to use the telephone registration system. Satellite registration points were established to spread the workload of the staff. Under a culture of friendliness and compassion, the administration deactivated many data input verification mechanisms of the telephone registration system to ensure user friendliness of the new system, and the verification of eligibility of students was substantially relaxed. Students were allowed to register for courses in any satellite registration location, and it was difficult to verify the authenticity of the signatures of academic advisors. Although students were required to consult an academic advisor, many did not. The implementation of the dual registration process created many problems, and severely affected the quality of the registration process and associated information. A sample of the problems include:

- Student enrollment exceeded class cap due to the simultaneous access to the registration system by telephone, and by staff from satellite terminals.
- Students without the proper prerequisite were allowed to enroll in classes
- A "sympathetic" staff member would allowed students to enroll in special project classes without the permission of instructor
- Students were allowed to sign up for courses to guarantee seats for friends, and greatly inflated the perceived demand for courses. The

distorted information eventually prompted the opening of new sections with extremely low enrollment.

- Students encountered problems in graduation due to the omission of academic requirements because many students were able to bypass academic advisement through the new system.

The telephone registration system was blamed for many of these problems even the system was capable of handling many of these problems in its design. The coexistence of a staff-assisted registration process allowed the overriding of registration restrictions, and in many cases, ineligible students were allowed to register for courses through ill-trained staffs and a lack of data support to prevent deceptive maneuvers. The continuation of the staff-assisted registration process restricted the telephone registration system to a supportive role for data entry, rather than being used an intelligent data processing system.

### The Reluctant Data Owners

The implementation of a campus-wide Data Management Systems created a new demand for electronic data. Various functional units were given the responsibility to collect data at the point of transaction, and the functional managers became responsibility for the proper release of the data for approved usage. The new responsibility was added without additional resources, and most functional units delegated the tasks to the lowest level staff members. The functional units continued to use paper-based data collection instruments and relied on low-cost staff for data entry. There were minimal guidelines for data quality assurance and the accuracy of the resulting database was questionable. After years and the assertive effort of a budget planner, functional managers finally agree to certify a version of the database as "official data", but yet there is no mechanism to ensure the credibility of the database in the long-term.

The new responsibility as owners of functional data took managers by surprise. Many managers hesitated in the release of data to others for the fear of giving out inaccurate data and the possible violation of information privacy when the data ended up in the wrong hands. As a result, managers were extremely reluctant to release data, and only with the explicit instructions from their superior. However, top management had delegated the task of approving data requests to the functional managers, and only a privileged few were able to have access to the database.

### The Race for Data Reports

The creation of a Management Database prompted the usage of data for decision making and academic program planning and evaluation. All of a sudden, the demand for data reports increased with great difficulties in obtaining them. The functional managers remained reluctant in getting involved in data distribution. In many cases, functional data reports presented very low value for other applications. Senior managers were able to extract data reports through the assistance of the Computer Center - the custodian of the database, and many functional managers had no objection to the arrangement. Other data report users eventually learned that the Institutional Research Office have access to the database, and provided customized data reports. The mad race for data reports ended in meetings where participants arrived with different versions of data reports, with a variety of formats in data presentations, and the hottest issue became the accuracy of conflicting data from the various data reports.

### The Battle of Data Definitions

Although the COLLEAGUE system provided many standard data reports, data users soon found out that these reports could not satisfy the evolving needs for information. For example, a user requesting a historical account of graduates by majors could be given a list of 5000 names. Users who were unfamiliar with data analysis techniques would be totally overwhelmed by the data report. An additional complication was the coexistence of multiple versions of data files, each tailored to a specific data query. Conflicting data reports would be generated from these closely related data files. The functional managers relied on the users to clearly specify the type of information requested, and most users were unaware of the minute differences in data definitions. For example, the total number of graduates in a given period would be different from the total number of degrees awarded for the same period when some students completed two or more degree programs simultaneously. Another common problem was that the headcount number of students was different from the FTE number of students. The casual data user would not be able to distinguish the two different reported numbers of students. The individual interpretation of data definitions, and the subsequent requests for customize data reports, with the absence of clear guidelines for the applications of various data reports, created great confusion among the users. Many users eventually concluded that the Data Management System could not provide data, while the reality was that a consistent, timely approach to report data in a format that was comprehensible to the users was never established.

### When Data is Free

As the custodian of the Management Database, the Computer Center confronted a major challenge in supporting the organization's need for data. Most employees in the organization were unfamiliar with the use of electronic data, and heavily relied on printed data reports. The Computer Center was not budgeted for staff time and costs of supplies required for preparing and printing data reports. The functional units faced the same dilemma of attempting to support the mandate to distribute data without funding. However, the users have been informed and expected the availability of data reports as a free service. In a mad race in search for data reports, users relied on personal connections and arbitrary mandates. Delays in receiving data reports triggered the users to send multiple requests for reports to all available sources. The uncoordinated efforts to hunt down data reports often resulted in multiple requests for the same data report from different members of the same department. This resulted in the repeated production of data reports for a single usage. This eventually convinced the functional units more than ever to avoid data distribution activities that could be a bottomless drain for limited resources.

### Call Them Official Data

The on-demand creation of data reports triggered another issue. Some data such as student enrollment data were time sensitive. As a result, data reports could differ depending on when the database was queried. There was time when senior officials were eager to publicize enrollment figures before the closing of registration activities. Other times the best available data set was included in reports to funding agencies. The very nature of a public announcement of the data set sealed them as official data. This undermined the integrity of the Management Database, which was used to generate reports for auditing activities. Discrepancies between information in the audit report and the "official" data were frequently sources of embarrassment. In the more serious cases, disagreement between the best available data set, and the actual data set reported in subsequent years could jeopardize funding. Users who were unaware of the time sensitivity of certain types of data questioned the integrity of the information system, while the data discrepancy problem could be the combined results of data query method, data analysis method, and data report generation date. The end result was a widespread distrust on the overall data quality of the institution.

### Data Relevancy Problem: Data Rich But Information Poor

The Management Database was designed for operational support, and data elements were kept current to reflect the latest changes. However, the design of the database and the use of standard management reports created shortcoming in the capturing of planning data. The following example illustrated these shortcomings.

For a period of time, many senior level students were unable to graduate because they could not enroll in a freshman level course. An analysis of student enrollment data indicated that there was a decrease in the number of students in the program, and the number of seats for the freshman course have been kept at the same level. As a matter, many sessions of the course were not at capacity according to enrollment data. The analysis did not support the opening of new sessions for the course. Later, the research effort of a faculty member reviewed that mostly seniors only have been able to enroll in the course in recent years, and nearly half the enrollments were from students outside of the program! Further investigation showed that the course was always at full capacity by the end of the registration periods, but student withdrawal lowered the enrollment figures. The new information supported the offering of new sessions, and the problem was resolved within 12 months. The irony was that the information was in the Management Database, some even reported to the academic units but ignored because there was no perceived value for the information.

## CHALLENGES IN INFORMATION RESOURCES DEVELOPMENT

The University of Guam has been fortunate that some visionary leaders have realized the critical role of information technology in the continuous growth of the organization. Systematic acquisition of state of the art technology have allowed the university community to stay connected with the rest of the world in an otherwise isolated environment in a sparsely populated Pacific island of Guam. Despite the technical achievement in telecommunication, there is still limited understanding on the management of organizational information resources. There are a few lessons we could learn, and a few challenges for the organization.

### Information Resources Treated As An Investment Issue

A common reaction to the deficient in information resource is to seek capital investment in better technology, or to purchase a new software system. There has been limited attention to areas such as system and facility maintenance, user training and support, data architecture development, data quality assurance, and data distribution. Organizational issues have been the major barriers to the improvement of information resources.

### Promote Information Resources by Delegation

The practice of delegating the responsibility of data ownership to functional units has mixed results. While the capturing of data at the point of transaction is an efficient approach to acquire data, unmotivated functional managers present major obstacles to data quality assurance, and the timely distribution of data. The decentralized approach to information resource management also undermined the strategic role of information resources as a critical organizational asset.

### Limited Perspective to Information Resources

Individual managers with limited experience in data-driven decision making may underestimate the value of information. The inappropriate use of data or the negligence of important data sets towards decision-making tends to distort the value of information resources in an organization. There should be caution in equating computer literacy or technical skill with information literacy. Even experienced statistician and seasoned researcher may lack the proper perspective to fully appreciate the demanding discipline required for managing information resources. One of the most sensitive issues surrounds data definitions. There is a need for the systematic construction of organi-

izational data architecture to ensure consistency in the use of information.

## CONCLUSION

This paper reports the experience of information resource development at the University of Guam, which is obligated to adhere to management and information reporting standards of North America. However, the university employs a culturally diversified workforce, and serving a student body from small Pacific nations and the Asian regions. Management practices influenced by the cultural backgrounds of workers and students created challenges in the management of information resources. The development of information resources has been slow despite the acquisition of modern technology. The lack of organizational discipline crippled technical development, and the limited understanding of information resources limited funding for information resources development. Although the challenges for information management may be similar to organizations in other regions of the world, the feasible solution to handle the management challenges could be substantial difference.

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