Executive Summary

GCC Mission Statement:

> *Our mission as a unique community college is to be Guam's lead education agency in training, education, and support services in all ways relating to Guam's workforce development needs and the career and employment goals of the people; and to work in partnership with industry to advance economic development in Guam as a regional focal point for Micronesia within the Asia-Pacific Rim. Our mission is human resource development in support of Guam's major social and economic development goals.*

Guam Community College faculty and staff, with the assistance of a consultant from the Graduate School, USDA, conducted an assessment of the current state of technology on campus. Through a process of interviews and strategic planning sessions with representatives from all areas, site tours, researching of GCC documentation, and comparing GCC with other organizations of a similar size and technological sophistication, the study generated a number of findings and, for each finding, a recommended solution.

Findings and Recommendations:

1. Place all "integrated database" activities under project management control.
2. Postpone the bandwidth expansion project until the rest of the recommendations of this report are implemented.
3. Modify organizational charters, where they exist, to ensure that technology efficiently supports the needs of the college.
4. Make the technology decision-making process more collaborative.
5. Create strategic plans and schedules for all areas of the college.
6. Ensure that technology funding is not too dependent upon funding source and is properly integrated into GCC's mission, strategic goals, and technological environment.
7. Re-centralize the technology environment to be closer to the end-user.
8. Allow for different technological attributes, such as openness, security, and responsiveness, in the different functional areas on campus.
9. Restructure customer service and support, and mandate a level of support that is responsive, skilled, and effective.
10. Maximize the use of GCC's talented employees.
11. Create and fill a Chief Technology Officer (CTO) position.
12. Train GCC personnel for their current jobs and for their next jobs in accordance with GCC's strategic goals.

Goals of the Technology Audit project:

In April 2006 the Guam Community College (GCC) and the Graduate School, USDA collaborated to conduct a Technology Audit. The purpose for the Technology Audit was to identify the technological[1] challenges facing GCC, assess the college's capability to handle them, and propose ways to overcome them in preparation for future growth.

While the growth in student enrollments has been steady over the past 6 years, the increased presence and use of modern technology has led to significant growing pains. In particular, GCC changed from being a vocational high school to a true community college circa 1999. This change led to advances in the number and sophistication of faculty and curriculum. These advances, in turn, led to GCC outgrowing the capabilities of its student information system (NIAS), financial management system (DYNALOGIC), bookstore system (COUGAR MOUNTAIN), inter- and intra-networks, and its capacity to adequately support these areas.

Equally noticeable is the lack of a clear connection between technology and instruction. The connection between technology and administrative, business and finance operations is much clearer and appropriate. How to efficiently use technology in course instruction is not as clear. This confusion is caused as much by the presence of an inappropriate technology management structure as it is by the fast-paced world of technology.

It should be said at the outset that these problems originated honestly and predictably. Those structures, policies and procedures that were appropriate for one era of GCC's technological life have simply been overcome by events. A renewed effort is underway to embrace those aspects of the new technological environment that are necessary for the entire enterprise to flourish. What was adequate on a smaller technological scale is destined to failure on the larger scale.

Specifically, those support and management structures that once served GCC well are simply insufficient now that there are upwards of 1,000 nodes on the network, vastly increased use of and content on the internet, constant growth in the use of technology for classroom instruction, etc. Therefore, just as the Information, Equipment, and Application aspects of GCC's

[1] For our purposes, technology will encompass all of GCC's Information (data, records, documents, etc.), Equipment (computers, networks, cameras, etc.), Applications (operating systems, software, etc.), Support (staffing, skills, training, service, etc.) and Management (command, control, and communication).

technology have expanded, so must the Support and Management aspects expand. A centralized MIS function, while adequate and even desirable for business and financial systems, is inefficient – and even at cross-purposes – to instructional environments where experimentation and early adoption of technology and wide-spread diversified usage are required.

In truth, technology should be merely an enabler of the college's real mission. Air conditioning, electric lights, and running water are also technologies needed by the college. They are expected to be there when needed, without question. Just as it is unacceptable for a classroom to not have air conditioning or lights, it is unacceptable for a finance office to not have access to a printer, or a computer class to not have reliable and effective access to the network or to the internet. These "modern" technologies, just like the "old" technology of indoor plumbing, must become transparent to the users by their unquestioned reliability. Achieving this end will require embracing several new Support and Management methodologies.

What is most needed is to remove any obstacles to efficiency. This undertaking will mean, among other things, the creation of new Support and Management structures and the production and implementation of an Enterprise Architecture (EA) document. The EA defines the technology environment, for today and for the next 5 to 10 years. However, the GCC EA can only be successful with new Support and Management methodologies in place.

Obviously, it is impossible to produce such a document without there first being "business unit" strategic plans[2]. With these plans as a guide, a proper EA can be created. With a comprehensive EA in place, then a series of implementation projects may be planned to control the effort and provide funding. Each implementation will incrementally move GCC from today's situation to tomorrow's vision.

Therefore, the goals of this project are to 1) identify GCC's strengths and weaknesses, and how to overcome the weaknesses (this report), 2) create a strategic plan which identifies GCC's strategic goals, prioritizes them, and shows the next steps in their implementation, and 3) determine the technological infrastructure for the future (EA) and how to get there.

[2] By business units we mean, at least, a Student Instruction Strategic Plan that addresses the needs for technology in the classroom, and Student Support Strategic Plan that addresses the needs for technology outside of the classroom.

This audit report primarily addresses goal number one, a vital first step in the process. By the end of this process, current problems should be resolved, GCC's vision of the future will be defined, and the way ahead will be in plain sight.

This audit report is a supporting document to the Information Technology Strategic Plan (ITSP). The ITSP defines the major technology goals of the college. The ITSP looks forward to the future and how GCC wants things to be in 5 or 10 years. The audit report speaks to the current situation. The EA will be a deliverable out of the implementation of the ITSP and will complete the move from today's situation to tomorrow's vision. (See Appendix A for a matrix showing where each Finding and Recommendation in this report is addressed in the Strategic Goals.)

Scope and Methods:

The scope of the Technology Audit Project is the GCC technological environment, both on-campus and at satellite locations, for all functional areas.

While the focus of the project was technology and its uses, it is important to have a basic understanding of the various functional areas of the college, their mission and processes. To achieve this, numerous one-on-one and small group interviews were conducted. (A complete list of those interviewed is contained in Appendix B.) Additionally, strategic planning sessions were conducted with the Technology Advisory Committee. This method of individual, small-group, and large-group meetings assured that everyone was heard, concerns were identified and recorded, and solutions proposed by those who are most knowledgeable and affected. The findings and suggestions of this report are the direct result of interactions with these key participants.

It might be useful to view GCC as three loosely connected functional areas: Classroom (what teachers need), Campus (what students need), and Administration (what administrators need), each with a strategic plan.

Principle Findings and Recommendations:

GCC's primary mission of educating the workforce is not being adequately served by technology. This result is true because of several factors, listed below. Again, it should be stated that were the college the same as it was even 6 years ago, the current situation would not be so dire. What has happened is that some technological advances (Information, Equipment, and Application) have outpaced improvements in other aspects of technology (Support and Management). This means that the majority of the corrective actions will be organizational, methodological, and managerial in nature.

1. Place all "integrated database" activities under project management control.

   CONDITION: The integrated database is a very large, complex, system replacement project. To accomplish it requires specialized skills in project management. Currently the published project plan is several months behind schedule without having been updated. A comprehensive description of the requirements for the new system has not been formally produced. The existing systems are not integrated. This lack of integration has meant that policies, procedures, and processes are now in use that may or may not work with the new system. The lack of integrated databases means that the vendor will have a very difficult challenge incorporating two separate databases into one.

   CAUSE: There is no project manager assigned with the skills necessary to make this a successful implementation. Project management disciplines should have been deployed when this project first started.

   EFFECT: GCC is at risk of scheduling deadlines, cost overruns, and user-dissatisfaction with the integrated data base project. The risk of having to run the new system in parallel with one or both of the old systems for an extended time is very real.

   RECOMMENDATION: Assign a seasoned project manager, create a project plan, facilitate the development of a requirements document, create test criteria and data, and ensure that data migration is properly addressed in the contract. It is not a wise choice to make existing departmental managers the project managers for this effort. They have enough to do in their normal jobs. This project warrants a dedicated person for the duration of the effort.

It could be a useful time to demonstrate and mentor others at GCC in project management disciplines, but GCC needs to assign a highly qualified project manager immediately. Certainly, it would be unwise to assume that the software vendor can or should fulfill this role for the college.

2. Postpone the bandwidth expansion project until the rest of the recommendations of this report are implemented.

   CONDITION: Since the beginning of this calendar year, internet access speeds have been degraded for all users.

   CAUSE: The assumed cause of these slower speeds is the increased use of the internet, primarily by students, to send and receive unauthorized materials.

   EFFECT: The access speed to the internet for all users is degraded to an unacceptable point. With the assumption that the cause is mostly due to unauthorized uses, the solution is two-fold. First, enforce GCC's internet and email usage policies. Second, increase the bandwidth onto campus by putting in a new MCV line to replace the current T1 line.

   RECOMMENDATION: Once the recommendations of this audit are implemented it is probable that another solution to the current bandwidth problem may be offered which GCC would prefer to adopt. However, if the current bandwidth project is allowed to continue, then GCC will lose that opportunity.

   A 60-90 day delay should be acceptable to all parties. In particular, there is the very real possibility that the networking infrastructure called for in the EA may better accommodate the needs of the various functional areas. GCC may prefer to have more than one access point to the internet. This issue is a fundamental architectural decision that needs to be made after the recommendations in this report have been addressed.

   Another reason for preferring more than one path to the internet is for risk mitigation. With a single path onto campus, that means there is a single point of failure. With multiple paths onto campus, not only can functional areas be better served, individually, but GCC gains a valuable redundancy capability.

3. Modify organizational charters, where they exist, to ensure that technology efficiently supports the needs of the college.

   CONDITION: Many users of technology feel disenfranchised by the MIS department. MIS does its best to satisfy the disparate needs of faculty and staff, while maintaining a secure environment. Expansion in the use of technology and the number of computer labs has outpaced MIS' capacity to provide adequate support. Faculty wishes to be on the leading-edge of technology for the benefit of their students while MIS is struggling to just maintain the existing infrastructure.

   CAUSE: GCC is using a centralized management paradigm that is an inefficient and ineffective way to control modern technology environments.

   EFFECT: Users experience poor customer service. MIS feels pressured and constrained, unable to satisfy the users' needs and unappreciated for the work they do. Users and MIS first become antagonistic toward each other, and then they become uncommunicative. Left unresolved, the situation spirals down into technological anarchy where users find their own technology dollars and go "off the net."

   RECOMMENDATION: GCC needs to modify organizational charters to ensure that technology efficiently supports the needs of the college. Modified charters may mean that some responsibilities will be transferred from one organization to another. The immediate need is to change GCC from having a centralized MIS function into having a centralized IT infrastructure organization and several functionality-specific IT support groups or teams.

   There are a few different ways to implement such a structure but the overriding requirement is that users are afforded the very best customer service and support. In a centralized MIS structure, the needs of the users must be balanced with the needs of the MIS organization. When organizations and architectures are small this can work well. GCC, however, is long past the time when this worked well. A new decentralized, yet centrally controlled, technology support structure is required. (See Finding #4 for a discussion of how this centralized control will be accomplished.)

4. Make the technology decision-making process more collaborative.

CONDITION: There is no generally accepted vision of GCC's technology environment. There are, in fact, several conflicting visions. In order to meet their own needs, several organizations have adopted their own view of the future of technology in their area and are pursuing it independent from MIS involvement. Other users feel that MIS is implementing its own vision without regard for their needs. Sometimes, MIS is seen as too heavy handed in its policies and actions. Other times, MIS is completely unaware of what an organization is doing until there is a problem.

CAUSE: The MIS function is not as accountable to the users as it should be. Other GCC organizations are not as accountable to MIS and other users as they should be.

EFFECT: There is a definite "Us vs. Them" situation. There is no clear GCC definition of technology. There is no single vision for GCC's technological future. Left unattended, GCC will ultimately be spending more money to implement disparate and conflicting technological visions than it would with a single, comprehensive vision.

RECOMMENDATION: A new methodology for controlling technological decision-making is needed immediately. Not only must the constituent users of technology be more involved in decision-making, but senior management must empower a new Technology Control Board to have decision-making authority. This new Technology Control Board (TCB) will start with the Technical Advisory Committee (TAC) and expand its membership to include more high and mid-level employees from all areas of the campus (perhaps even from the student body). The TCB will then be granted a charter to make technology decisions for GCC. Senior managements' role will be to ensure the proper operation of the TCB and to provide guidance and funding, as needed.

This shift from "advisory committee" to "control board" is fundamental to enabling GCC to implement the ITSP and EA. Only with a new TCB can there be a single technology voice on campus, representing all the needs of the college. This new centralized control board will recognize its responsibility to provide all users with the technology and support they require.

The process of decision-making will be collaborative; everyone with a stake in technology must be represented in the TCB. The TCB will set technology priorities and be responsible

for technology operations – in turn holding themselves (See #3 above) accountable for their areas of responsibility and actions. The only exceptions to the standards and policies will be those granted by the TCB.

Managers may not delegate their responsibilities and senior managers will still be ultimately accountable for all decisions. However, senior management is best served by empowering a highly motivated and multi-functional entity such as the TCB. Senior management is best served when everyone on campus (represented on the TCB) can agree on a technological direction or priority. The only way to ensure the TCB will effectively fulfill this role is to delegate a significant amount of authority to the board. Advisory committees are far less effective. Empower a group of professionals to make decisions governing their own technological concerns and the results will be noteworthy.

5. Create strategic plans and schedules for all areas of the college.

   CONDITION: MIS is responsible for most of the technological resources on campus. Users, particularly faculty, are constantly trying to make better use of technology. This has meant a steady increase, for example, in the number of computer labs. But it also has meant a constant increase in the types and number of new software products in use on campus. Therefore, users need help with the newest technologies but MIS is unable to help.

   CAUSE: MIS requires some lead time to be able to provide new labs and to be able to support new software. Unfortunately, it is easier to bring new products onto the campus than it is to support them.

   EFFECT: MIS appears to be an obstacle to improvements in course instruction. MIS always has to explain why they cannot do what is asked of them. Faculty starts using products that are outside of MIS's ability to support. In the end, students might be the ones to suffer the most.

   RECOMMENDATION: It is impossible for technology to look 5 and 10 years out into the future without information from those whom it serves. Therefore, it is imperative that there be strategic plans and schedules created for each area on campus. (Schedules are a vital part of planning since they provide timeframes and sequence information.) Only with a clear view of the needs of the users can an adequate Enterprise Architecture and implementation

plans be created. Without these plans and schedules, the TCB will never have enough lead time to provide the services needed by the users when they need them.

At a minimum, the following areas need to produce 3 to 5 year strategic plans: Business and Finance, Student Records, Administrative Services, the Computer Science department, the Instructional Technology Center, and the School of Trades and Professional Services. It will be the TCB's responsibility to ensure that each of these plans is properly addressed in the EA and implementation plans. Also, it will be up to the TCB (seeing as it is composed of members from each of the business units) to determine the priority and sequence of implementation.

6. Ensure that technology funding is not too dependent upon funding source and is properly integrated into GCC's mission, strategic goals, and technological environment.

   CONDITION: Each department has a technology budget. No doubt it is used to implement the department's strategic goals. MIS also has a technology budget, for both its internal goals and to provide services for the campus. Sometimes funding is tied tightly to a particular product and the only way to enjoy the grant is to procure the product. Yet, how are these three independent activities tied together into what is best for GCC?

   CAUSE: There is no centralized technology budget formulation process. There are no strategic plans and schedules from the business units. There is no strategic Enterprise Architecture in place for all of GCC.

   EFFECT: Procurements are not justified by the strategic needs of GCC. Limited funds are not adequately prioritized and applied in accordance with strategic needs and goals. More money is being spent on technology than is necessary.

   RECOMMENDATION: With the creation of the TCB there will be a single point of contact for all matters technological. It will be the TCB's responsibility to create, communicate, and monitor compliance with all technology mandates. The purpose is not to add a layer of questionable bureaucracy to the process but rather to ensure that the college's mission and strategic goals are not compromised by unhelpful practices (such as accepting equipment that is offered via a grant but that does not fit into the college's strategy).

Further, the current process whereby MIS "approves" all technology purchases may be eliminated. The TCB will control all technology purchase requests before they are sent to procurement. In effect, all purchase requests for technology will come through the TCB rather than directly from the business units on campus. In this way, limited GCC funds (including the Technology Fee) are spent on agreed upon GCC priorities in accordance with agreed upon GCC standards.

7. Re-Centralize the technology environment to be closer to the end-user.

CONDITION: The technology environment lacks resilience, redundancy, openness, and adequate support. The number of operating systems, platforms, and applications is too large to effectively be supported by a single MIS department. Servers and networks are too centralized which makes them easier to maintain centrally but less efficient for the users. And many of the GCC users are highly qualified and capable technologists capable of performing many of the functions currently performed by MIS.

CAUSE: The MIS charter is to be the provider of technology to all GCC. This model allows faculty to concentrate on teaching, staff to concentrate on operations and finances, leaving MIS to care for the technology infrastructure. This approach worked very well for a time. That time is now passed. The needs of the users are more sophisticated today and demands for support are greater today. Therefore a less controlling MIS function is necessary.

EFFECT: When internet access is slowed by student usage, the administration function suffers. When new technology would be beneficial for course instruction, MIS is slow to introduce it into the architecture. When MIS needs to perform preventive maintenance, hardware replacement, and other such duties, these tasks are superseded by work orders for more mundane tasks.

RECOMMENDATION: Where faculty and staff are capable of performing their own preventive maintenance and troubleshooting, such as in the Cisco Academy, centralize the equipment and control of resources to them. The same concept is true of the Instructional Technology Center, the Computer Science department, and perhaps other areas. Further, as much as possible, remove central points of failure such as centralized server rooms and single communication lines onto campus. It would seem prudent to match the bandwidth provided with the needs of the using area. For example, the Business and Finance area could

probably do very well with a single T1 line dedicated to its use, but available to others on campus as an emergency backup connection. The classrooms also might find a single T1 more than sufficient for their purposes if the line were dedicated to them. For planning purposes, perhaps a third T1 line could be dedicated to student services (email, etc.) and provide GCC with a third backup connection for emergencies. The idea is not just to de-centralize away from MIS control but to re-centralize into responsible areas, thus providing better service and redundant capabilities.

8. Allow for different technological attributes, such as openness, security, and responsiveness, in the different functional areas on campus.

CONDITION: In order to protect the GCC LAN, a certain level of security, limitations on access, and compromises in responsiveness are made. These decisions are prudent when dealing with protecting the financial management system and the student information system. They are far too restrictive for the normal computer lab and for some of the faculty areas. There is no way that a single network can accommodate all of these different requirements.

CAUSE: GCC operates the campus' network as a single, centralized technology architecture that does not easily accommodate the needs of the different functional areas.

EFFECT: Exceptions have been made, or taken, to the policies in place. Certain areas have been allowed to go "off the net" without clear authorization or planning. Some areas, like the Cisco Academy are authorized self-sufficient "pods", but they could be more self-sufficient. GCC is in the midst of quiet rebellion against centralized control.

RECOMMENDATION: What the Registrar's office needs in terms of network security and control is not the same as what the Cisco Academy classroom needs. In fact, it probably would be detrimental. When the entire campus is viewed as a single, centralized entity, it requires a single-mindedness about security. However, in a re-centralized architecture, each responsible area can be allowed to define its own technology attributes.

Therefore, the TCB will define what levels of security and control are necessary and prudent for each discrete functional area on campus. What is appropriate for the Cisco Academy is not for the Business and Finance area. What might be enough for the open labs should not be assumed as adequate for anywhere else on campus.

This approach is the logical outcome of recommendation #7 where the TCB delegates selective authority to discrete areas of functionality.

9. Restructure customer service and support, and mandate a level of support that is responsive, skilled, and effective.

CONDITION: MIS does not treat all work requests the same way. Some are logged and most are not. There is no centralized help desk but rather an email system that is suited only for capital improvement and maintenance issues and not for technology problems. Without a means of tracking all work requests there is no way to assure users of fast service. There is no closed loop system where users are aware of the status of their complaint at all times. There is no effort to trend problem areas and resolve root causes. Some areas on campus are very happy with the technical support they receive but mostly because they know who to call, and because they do not use the email system. Specialized technical support personnel are not always utilized to the best advantage.

CAUSE: GCC has not adopted an effective customer service and support methodology. All technology resources are assigned to, and stationed in, MIS. The work order and tracking system is inadequate.

EFFECT: Good customer service is personality driven. If users know who best to call, they will like enjoy good customer service. If they do not, or if the person they call is unavailable (possibly working on less important tasks) then they will be dissatisfied.

RECOMMENDATION: Currently, MIS uses the "eMaint" system to track some of the work they do. Yet, it does not capture all of their customer service and support activity. Worse yet, the system is not real-time. Most urgent calls for assistance are by telephone to an individual within MIS and are never logged.

These facts bring to light two problems. 1) There is no centralized Help Desk to serve as a reliable, single point of contact for users with problems/questions. Users must know who to call, who is most likely to be available, or who is most knowledgeable about their problem. MIS personnel are constantly interrupted by these calls for help that should have been received by a Help Desk function (in real-time) and prioritized for urgency before being

routed to them. 2) MIS is unable to quantify the amount of work they do in support of users and, therefore, has no means of qualifying for additional staffing, if/when needed.

A shift to a de-centralized structure will not eliminate the need for a centralized Help Desk. In fact, with more than one responsible group on campus it is even more important to have a single point of contact for the average user. The user should not have to understand the GCC organizational chart in order to call in a problem. The implementation of an effective Help Desk function is important in its own right, but it is paramount to a successful re-centralization of the architecture. GCC needs to then procure Help Desk software robust enough to allow multiple concurrent users and that can track and trend Work Requests. (There are many other requirements this application should provide. These requirements will be documented under the auspices of the Enterprise Architecture).

Then, an analysis needs to be made of how best to organize customer service and support in the new re-centralized architecture. All existing MIS resources might remain assigned to the re-chartered MIS department. From there, individual specialists (Apple, FMS, Windows, networking, etc.) would have their desks in those areas where their skills are most needed. The shift from a centralized structure should mean that technical skills should be more closely positioned to the areas where their skills are needed most and most often. For example, the Apple/Mac technician could have his or her desk next to the Mac labs instead of in the MIS office.

There are concerns that must be addressed for this de-centralization and re-centralization to be effective. They are a loss of disciplined practices and reduced accountability to management. Specifically, without ways of measuring workloads within an organization it is impossible to justify staffing and budget. Therefore, the TCB will establish discrete measures for tracking and analyzing customer service and support. These measures will be captured in real-time on an automated system. (The existing eMaint system is inadequate.)

In light of the current MIS situation, with high turn-over in personnel and the constant threat of personnel being called to active military service, it would be prudent to keep all current MIS personnel assigned to MIS and stationed in accordance with their specialties. This way, GCC can more easily realign resources when these situations arise.

10. Maximize the use of GCC's talented employees.

CONDITION: Some of the very best resources available on island work for GCC. It is difficult to "contract" with these people to get them to work on GCC projects. Therefore, GCC does not always end up with the best solutions to problems. Worse yet, these GCC experts are possibly required to work with solutions that they could have done better.

CAUSE: GCC experts are faculty, mostly, and there are limitations on how their time may be used for GCC projects.

EFFECT: GCC is not getting the best and brightest, and most knowledgeable and most affected, involved in solving its technology problems.

RECOMMENDATION: Currently, the faculty has not been engaged enough on the implementation of networks and other systems on campus. It is unnecessary to send people off-island to gain job skills when GCC is not fully utilizing the skills already available on campus. For the private and public sector to be contracting with GCC technology faculty, while GCC itself does not avail itself of their talents, is not a wise use of these resources.

It will be a major success factor for the TCB to correct this situation quickly by getting and keeping these experts involved in the planning and implementation of the Enterprise Architecture.

11. Create and Fill a Chief Technology Officer (CTO) position.

CONDITION: There are too many opinions on campus about where GCC's technology should be going. Users' groups and advisory committees have been tried and failed. Departments have been told to work their issues out. Policies have been issued but exceptions are common. GCC needs a strong leader in this area just as in every other important area on campus.

CAUSE: GCC does not have an executive level position, answerable only to the President, to deal with technology.

EFFECT: It is difficult for committees, no matter how empowered and capable they are, to replace the value of a capable leader. It is difficult for committees to be successful without a strong leader as their champion and guide.

RECOMMENDATION: While technology decision-making authority should rest in the TCB, it still remains for someone to speak for the TCB to senior management, and to speak for GCC about its technology to entities outside of GCC. This is the Chief Technology Officer's role (we have chosen "technology" rather than "information" officer to highlight the fact that technology is much more than "information.")

The GCC CTO will be a unique position where his or her ability to be a collaborator, negotiator, planner, communicator, and manager are far more important that his or her ability to be a technology guru. The campus already has very capable technology gurus and visionaries and they should be allowed to serve in these capacities. The CTO's objective is to encourage, enable, and challenge the talented people in the TCB to do what is best for the college. A CTO who understands how to build a team, provide a safety net for those with new ideas, find the win-win scenario in difficult situations, lead through influence rather than by command, and maintain a positive vision of the future, will best serve the needs of the TCB and the goals of GCC.

12. Train GCC personnel for their current jobs and for their next jobs in accordance with GCC's strategic goals.

CONDITION: MIS personnel are very highly trained. While not a problem in itself, there are others on campus who should receive more training. MIS personnel are overly redundant in some skills and certifications. Not everyone needs to be certified in order to do a job. There are those in other areas who do not have the same access to training opportunities but should. Training should be aimed at fully qualifying a person for their current position and, in light of future needs, their next position.

CAUSE: Since the MIS function is centralized it makes sense to centralize technical skills as well. However, this centralization will now need to be modified (See above Recommendations.)

EFFECT: GCC is over-balanced in technical certifications on the MIS side, especially in an environment where more of the MIS function will be performed by those outside of MIS.

RECOMMENDATION: All technology funding will now belong to the TCB. The TCB will determine how limited GCC funds will be spent. Each department and organization will be allotted training budgets as usual. However, the emphasis will be on training people for the jobs they have or the new jobs that the strategic plan requires. This means that not everyone will be trained in the same things. GCC does not have the luxury of having everyone able to backup everyone else. If each technician has at least one backup person, that is sufficient.

Advanced training, with certifications, for those outside of MIS who are involved in technology is currently lacking. GCC needs to keep ahead of its students in the technologies being taught them. GCC prides itself on providing the types of graduates that employers want to hire. Employers want employees who possess technical certifications as proof of their mastery of a skill. Certifications are becoming even more desirable than college degrees. GCC should support its faculty in gaining the certifications they need to continue to be leading-edge educators and mentors.

Appendix A. Matrix of Findings to Strategic Goals

Finding and Recommendation	Strategic Goal
1. Place all "integrated database" activities under project management.	1. GCC will develop and implement a target Enterprise Architecture. 2. GCC will develop policies, procedures, and processes to analyze and acquire the components (hardware, software, applications) of the Enterprise Architecture. 5. GCC will enhance the governance process to provide timely, efficient, integration of users' needs into decisions on investments in technology.
2. Postpone the bandwidth expansion project until the rest of the recommendations of this report are implemented.	1. GCC will develop and implement a target Enterprise Architecture. 2. GCC will develop policies, procedures, and processes to analyze and acquire the components (hardware, software, applications) of the Enterprise Architecture. 5. GCC will enhance the governance process to provide timely, efficient, integration of users' needs into decisions on investments in technology.
3. Modify organizational charters, where they exist, to ensure that technology efficiently supports the needs of the college.	5. GCC will enhance the governance process to provide timely, efficient, integration of users' needs into decisions on investments in technology.
4. Make the technology decision-making process more collaborative.	2. GCC will develop policies, procedures, and processes to analyze and acquire the components (hardware, software, applications) of the Enterprise Architecture. 5. GCC will enhance the governance process to provide timely, efficient, integration of users' needs into decisions on investments in technology.
5. Create strategic plans and schedules for all areas of the college.	1. GCC will develop and implement a target Enterprise Architecture.
6. Ensure that technology funding is not too dependent upon funding source and is properly integrated into GCC's mission, strategic goals, and technological environment	2. GCC will develop policies, procedures, and processes to analyze and acquire the components (hardware, software, applications) of the Enterprise Architecture. 3. GCC will acquire the funding needed to implement the Enterprise Architecture. 5. GCC will enhance the governance process to provide timely, efficient, integration of users' needs into decisions on investments in technology.
7. Re-centralize the technology environment to be closer to the end-user.	1. GCC will develop and implement a target Enterprise Architecture. 5. GCC will enhance the governance process to provide timely, efficient, integration of users' needs into decisions on investments in technology.
8. Allow for different technological attributes, such as openness, security, and responsiveness, in the different functional areas on campus.	1. GCC will develop and implement a target Enterprise Architecture.
9. Restructure customer service and support, and mandate a level of support that is responsive, skilled, and effective.	1. GCC will develop and implement a target Enterprise Architecture.

10. Maximize the use of GCC's talented employees.	1. GCC will develop and implement a target Enterprise Architecture.
11. Create and fill a Chief Technology Officer (CTO) position.	5. GCC will enhance the governance process to provide timely, efficient, integration of users' needs into decisions on investments in technology.
12. Train GCC personnel for their current jobs and for their next jobs in accordance with GCC's strategic goals.	1. GCC will develop and implement a target Enterprise Architecture.

Appendix B. List of Participants (27)

Administration	Faculty	MIS
Herominiano dela Santos, President	Mike Setzer	Francisco C. Camacho
Mary A.Y. Okada	Elaine C. Fejerang	Maurice V. Cruz
John R. Rider	Wesley T. Gima	Kenneth C. Bautista
John C. Camacho	Su-kei (Steve) Lam	Marlena Montague
Michelle S. Santos	Terry F. Kuper	Chris Camacho
Reilly A. Ridgell	John Limtiaco	
Patrick Clymer	Carol R. Cruz	
Joann Waki Muna	Jovita A. Valenzuela	
Doris C.U. Perez		
Joleen M. Evangelista		
Joseph L.G. Benavente		
Frances T. Danieli		
Robert L. Epstein		
Elizabeth J. Aquino		