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ABSTRACT

Papers on aspects of college admission, records, and institutional research functions are: "How To Improve Office Morale" (Victor Swenson); "Staff Meetings: How To Save Hours per Month and Develop Your Staff" (LuAnn Harris, Shelley Olsen); "Selling SPEED/ExPRESS" (Laura Patterson, Thomas Scott); "Advisement and Registration: A Terminal Solution" (Gregory Wist and others); "Women at the Top: Administration from a Woman's Point of View" (Raquel Henry, Rose Austin); "Guerilla Guide to Computing: Developing a User-Oriented System in a Small School" (John H. Brown); "Stress Management in the Workplace" (Barry Delcambre); "What's Hot in Institutional Research in the 90s?" (Mantha Mehallis); "Modern Voice Response Systems for Admissions, Financial Aid and the Bursar" (John Brown); "Doctoral Graduation Rates and Time-to-Completion in Ontario Universities: Data and Policies" (Maurice Yeates); "Business Process Re-Engineering: Transforming College Admissions" (Mariea Noblitt); "Ontario's Colleges of Applied Arts and Technology" (Colin Dobell); "Defining Enrollment Planning: A Nuts and Bolts Approach" (James, Maraviglia); "Developing a Computerized Multi-Campus Transfer Information System" (Larry Rubin and others); "Iran: Recent Educational Developments" (Peter Bartram); "Optical Scanning from Admissions to Grading" (Joneel Harris, Toni Allen); "High Order Technology in Enrollment Services: First the Destination, and Then the Path" (Mark Elliot); "U-View Plus for the Macintosh Registration Using a Graphical User" (Louise Lonabocker); "Total Quality Enrollment Management" (Jim Black); "Yes, New Technology Affects Recruitment and Marketing" (Gene R. Sherron); "An Introduction to EXAMINE: A Flexible Examination Scheduling System" (Michael Carter and others); and "New Staff Orientation: The Second Step in Insuring Your Students Get Quality Service" (Doug Hartnagel). (MSE)

Conference Papers

Selected Sessions of the 1993 AACRAO Annual Meeting

A World of Magic

79th AACRAO Annual Meeting
Marriott's Orlando World Center
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Contents

Preface

Dear Colleague:

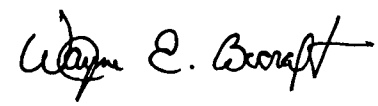
We know many AACRAO members had an opportunity to enjoy the worlds of magic that the Orlando area had to offer in April 1993 - Disney World, Sea World, Universal Studios, and the 1993 AACRAO Annual Meeting with its theme, A World of Magic. We hope they found magic there as well. Magic in meeting and networking with old friends. Magic in making new acquaintances. Magic in learning new information that will help them in their jobs.

Walt Disney said "If you can dream of it, you can do it." We all need to dream and dream big. We need to clear our heads of old ideas and make way for the new. We hope those who attended the 1993 AACRAO Annual Meeting came away with some new dreams and ideas to replace the old ones that have been around for years and perhaps grown a little stale. For you this book provides a refresher or allows you to glimpse sections that you were unable to attend.

For those of you who were unable to attend the Annual Meeting, the Conference Papers provides an opportunity to share the vast amount of information that was exchanged in Orlando in an easily readable format.

We hope all of you find in this publication at least one idea that will spark a new vision for you and your institution. That will make the effort to produce this edition of the Conference Papers truly worthwhile.

Sincerely yours,



Wayne E. Becraft
AACRAO Executive Director

Introduction

This year's 1993 AACRAO Conference Papers reflect the expertise and diverse interests and responsibilities of the membership and the profession. The Annual Meeting is the culmination of AACRAO's professional activities. The conference papers that come out of this four-day meeting make it possible to share many of the sessions with an audience that extends beyond those who are able to attend the Orlando conference.

AACRAO owes a big debt to the many professionals who make the Annual Meeting possible and to the many presenters who enrich and provide an invaluable resource for members.

AACRAO is an association of "doers" who take exceptional pride in the quality of their presentation and have an insatiable desire to share their knowledge. It is in this vein that the 1993 AACRAO Conference papers become a reality. We salute all who have had a part in making this possible. We are all significantly stronger professionally because of your contributions.

Gary L. Smith
1992-93 AACRAO President

How to Improve Office Morale

Vic Swenson
Registrar
Mankato State University

Office morale may be the most single important factor in the effectiveness of a given office. Therefore, it is of vital importance that everything possible be done to address the issues and focus on solutions. Thomas Peters and Robert Waterman, Jr., in their book *In Search of Excellence*, focus substantially upon people relationships as related to productivity. One very brief quote from this publication reads as follows:

> Treat people as adults. Treat them as partners; treat them with dignity; treat them with respect. (p. 238)

It is important for us to remember as we look at the issue of office morale that people relationships are probably the most important single factor. If our goal is to treat people as we would like to be treated, we will have come a long way in achieving the objective of improved morale.

The most important single consideration in the improvement of office morale over the long run is in the selection of employees. We must be sensitive to the needs and concerns of those employees already in place and help them strive for improvement. You cannot easily change the personal characteristics of an individual. It is far more appropriate to identify proper personal characteristics in the job description and then to select that person in the hiring process.

As you prepare for the selection of new employees, it is important that every consideration be given to the individual's personal characteristics and attitudes. It is likely that most applicants will meet the technical qualifications. Therefore, the most difficult part of the selection process is to properly identify those personality traits and characteristics important to this particular position. The job description should be written to include the technical qualifications of the job and also to include service functions of the position.

Before the interview, identify the appropriate questions to be asked and ask those same questions of each applicant. An office interview team should be established so that several individuals observe the responses of each of the applicants and can then pool their observations in the final selection process. This provides the benefit of various insights and becomes a shared management decision. *Foundations of Personnel* by John M. Ivancevich and William Glueck dedicates an entire chapter to the selection process. On the question of who makes the selection of new employees, they state the following:

> Generally, more effective selection decisions are made when many people are involved in the decision and when adequate information is furnished to those selecting the candidates. (p. 187)

It is important that selection be a carefully thought out and shared process.

You must investigate the previous employment record. The employee who was positive and effective in a previous employment is likely to carry those same qualifications to the new position. However, ineffective performance will also very likely be carried forward. When talking with past employers, discuss both the strengths and weaknesses of the applicant. In the final analysis, if you are not satisfied with any of the candidates, the search should be reopened and new applicants sought. Although this is a time consuming process, it will produce positive long-term results.

Improving the physical working condition within the office is another important consideration. If possible, each employee should have a workstation which provides some level of privacy and quietness. Change the wallcovering and plants, improve lighting, hang pictures, and rearrange the office.

It is wise to seek some advice and consultation if you plan to reorganize the physical layout of the office. An evaluation should consider the flow of traffic to the office, the physical arrangement for each employee, and the strategic locations of workstations as one relates to another. Colleges and universities often have a department within the College of Business that can help with office management. Departments such as this are pleased to be asked and are most cooperative in providing a base of support for you. This is a valuable resource to you and should be used if at all possible. If such a resource is not available to you, you may need to seek consultation outside the college or university.

Office morale can be substantially improved by effective communication. The office supervisor must clearly define office policy, office procedure, and office philosophy. In his book *Management and Morale*, F.J. Roethlisberger writes:

> When I am confronted with a complex situation involving the interactions of people, what people say is necessarily an important part of the data from which I have to make a diagnosis. Therefore, my first object is to get people to talk freely and frankly about matters which are important to them. This situation in which I try to get people to talk I shall call the interview. In the interview I use a number of simple rules or ideas: I listen. I do not interrupt. I do not give advice. I refrain from making moral judgments about the opinions expressed. I do not express my own opinions, beliefs or sentiments. I avoid argument at all cost. I do this by seeing to it that the speaker's sentiments do not react on my own. (pp. 92-93)

In another publication, *Improving Life at Work*, Richard Hackman and Lloyd Suttle make the following statement regarding supervision:

> The supervisor is critical to the quality of work life of employees. (p. 298)

The authors go on to identify a University of Michigan study which points out the ways in which supervisory behavior influences subordinates' satisfaction.

Office goals and objectives must be clearly defined. The decision making process must be clearly understood by office personnel and must be reasonable and effective. Decisions for change are usually better received if individuals have had some input in the process. It is important that there be communications within the office so that individuals know and understand the functions at other desks. It is also helpful if the supervisor is receptive to criticism and recommendations.

Office morale will be improved if the office operating procedures are well understood. Again, in his book *Management and Morale*, F.J. Roethlisberger makes the following statement:

> It is important for the executive to listen before talking. By this means he comes to understand the sentiments and situation of the person or group before he practices the art of persuasion or assurance in order to secure their loyalty, confidence, and cooperation. (p. 107)

The author goes on to further summarize the responsibility of the supervisor in dealing with human situations. He writes as follows:

> The executive has to size up human beings and human situations. In this respect, his orientation is like that of the clinician. He has to make diagnoses. Many times he has to handle a situation which is unsatisfactory to some one or more individuals. Inasmuch as often the source of the discontent cannot be accurately stated by the complainant, it is up to him to go from the symptoms to the underlying situation. Although he realizes that each individual is unique and is bringing to the work situation a different background and a different set of personal experiences, he is also aware when handling any one person that what he does may affect that person's relations with other persons in the organization. (p. 172)

The supervisor will substantially set the tone for the quality of service provided. Employees expect the supervisor to possess effective leadership skills and to lead by example. The supervisor is also responsible for setting the "attitude of service" provided by the office. Employees must know to what extent they have "freedom to act." When change is made, it must be clearly defined and appropriately discussed before implementation. The supervisor is substantially responsible for providing a pleasant and positive work environment and must constantly work toward that end.

Office morale can also be improved by the use of various means of recognition and awards. In all cases the criteria for receiving these awards must be carefully defined and made available in writing. This is necessary so that every potential recipient will know in advance what the expectations will be. In his book *Human Resources Management*, Fred K. Foulkes addresses the issue of compensation systems. He writes as follows:

> About incentives, the worst thing is a bogus bonus. (p. 167)

It is easy to understand the impact of this statement. If you are going to have a compensation system, it must be meaningful, effective, and a genuine recognition of work well done. He also provides the following three guidelines:

- Base yearly bonuses upon the performance of each individual unit.
- Determine bonuses in a simple and straightforward manner.
- Allow no "discretionary factors" in the bonus equation. (pp. 167, 168, 169)

He goes on to say:

> Our guidelines are really based on common sense. But they are fair and consistent and help us realize the full potential of our individual assets. (p. 169)

By and large, colleges and universities do not have a strong positive tradition of awards and recognitions. We need to continue to grow and develop in this area.

The "Employee of the Year" award is one commonly used quite successfully. An "Outstanding Service Award" is also one of great importance, particularly in offices whose function it is to provide services directly to individuals. Some educational institutions have developed an award system of this nature, and, after some time, have found it damaging to morale and therefore have discontinued the practice. There is always a danger that some individuals will feel left out and that the chosen individual, in fact, is not an appropriate recipient. Still other institutions have been successful in identifying the recipient by a vote of the coworkers. In the final analysis, award systems of this nature must be monitored carefully and evaluated for effectiveness.

Another less formal recognition is the "letter of support." These letters are written usually, by the supervisor, to express appreciation for effective service. This letter could be written in response to a specific incident or could be just a letter of encouragement to an employee who works diligently at getting the job done well. This kind of recognition is greatly appreciated by the recipient and serves as genuine encouragement.

In cases where problems must be addressed with an employee, such discussions must take place in a private setting and never in the outer office. It is probably best to have at least one additional person in that circle so that the likelihood of false accusations after those discussions will be minimized.

Perhaps the most effective recognition of all is praise, encouragement, and support on an ongoing basis. Most people respond much better to praise and encouragement than they do to criticism. Therefore, it is extremely important that there be in place an office philosophy that is supportive and helpful to each employee.

There is no simple way to improve office morale. If we are to be successful, we must use every means possible to provide a more positive and effective workplace. What is important to one individual may not be as important as to another. Therefore, it is necessary that supervisors be

very aware of the personal concerns and motivations of each employee. It is important that the process of getting the job done does not become more important than the people involved. If employees can see themselves as a vital link to effective office performance and service, and if they then receive the appropriate encouragement and support from their colleagues and supervisors, the morale within that unit will be strong and vital.

In summary, improved office morale is very difficult to separate from improved office services. Those offices that develop and maintain high office morale will be those same offices which provide the most effective services for their consumers. It is particularly important today that each of our offices focus on improved services. The public today is demanding more and more effective service. Authors Kart Albrecht and Ron Zemke, in the book *Service America!*, make the following statement:

> We believe a powerful new wave is about to hit the already turbulent business world. It's the wave of service, or more specifically a new and intense preoccupation with the quality of service. People are getting more and more critical of the quality of service they experience in their everyday lives, and they want something done about it. (p. v)

Improved office morale is the most direct route to providing effective and improved services.

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Staff Meetings

How to Save Hours per Month and Develop Your Staff

LuAnn Harris
Assistant Registrar

Shelley Olsen
Assistant Director of Admissions

Utah Valley Community College

We all agree that staff meetings are essential for the dissemination of information and to make certain everyone understands the information and correct information is given to patrons. Changes occur every term. Very seldom do all procedures stay in place from one term to the next. In our department, as enrollment increased, weekly staff meetings became a problem because of the productive hours lost each month. I could not ask people to come early or stay late for staff meetings that would require overtime pay or sometimes no extra pay. Compensatory time has never been successful in our department; illnesses and vacations are hard enough to cover. Sound familiar?

Good support people don't just happen. They must be nurtured and developed. Support people need to feel their sense of professionalism. They are the frontline; they *are* the experts!

The evolution and present format of our staff meetings has proved very successful in that we lose minimal productive hours a month and include everyone. We give better service, morale is high, and our office interpersonal relationships continue to improve.

Our general staff meeting is a pleasant retreat. It is an opportunity to express to employees how much they are appreciated. More money seldom makes a better employee. Studies have shown that job satisfaction comes before money in developing low attrition. A satisfied staff gives better service.

When professional development workshops are offered on campus, all our staff, including part-time, have an opportunity to attend or at least take turns attending the workshops. All fulltime staff attend the annual Utah ACRAO conference, the UACRAO midyear conference and at least one development workshop a year off campus. The delegation of responsibilities in order to be able to devote time to staff development has paid off.

Several publications on professional development have been used through the years, such as Service America, *ManagersEdge* tapes, *The One-Minute Manager, Practical Supervision, Communication Briefings, The Office Professional,* and, from AACRAO, *Building an Effective Student Service Team, Quality Student Service*, and *Effective Telephone Communication Skills.* A whole year of inservice material was obtained from AACRAO's wonderful series.
It takes a lot of inservice—"shots in the arm, if you will"—for support staff to maintain high levels of good customer service, particularly when we are asking them to do more and more with less and less. The morale benefits derived from these growth activities are immeasurable.

Early Staff Meetings

Ten to 15 years ago the Admissions and Records Office at Utah Valley Community College tried to hold weekly staff meetings. Those attending these meetings were the director of admissions and records, the assistant director of admissions and records, and all of the fulltime staff. Part-time staff covered the office.

At times it was impossible to hold these meetings on a weekly basis, especially during busy times of the year. Sometimes several weeks would pass without a staff meeting. We all know how quickly necessary details can change in admissions and records. During the times when staff meetings were not held, staff would feel a lack of direction. Those who had items to bring to staff meetings felt their concerns and questions were unimportant when they were left unanswered.

Our regular staff meetings included 12 people once a week. That was 12 to 24 work hours per week (approximately 48 to 96 work hours per month) lost to meetings, depending on the length of the meeting. Staff were being taken away from their work areas, and patrons were not being served with the expertise they expected; they were asked to come back at a later time. With increasing applicants and enrollment, it became evident that our staff needed to be on the job!

Weekly staff meetings consumed many hours of discussion, which at times did not apply to everyone. We had agenda items only pertinent to one area or the other; those who were required to listen to things that did not concern their area were often bored. These meetings became "gripe" sessions. Sometimes bad feelings were created between areas, and everyone left more stressed after the meeting than when it began.

In these early meetings, the director of admissions and records and the assistant director of admissions and records were in the same meeting—there were no other levels of management. All instruction came straight from the director and the assistant director. Some changes needed to be made.

Supervisor Levels Introduced

At this time supervisor levels were introduced in our Admissions and Records Office, and the director of admissions and records at UVCC went on to become the dean of academic support services. The assistant director of admissions and records became the registrar/director of admissions. Under the direction of the registrar/director of admissions, supervisor levels were created. We had a supervisor over admissions, one over registration, and one over records. This brought a change in the structure of our staff meetings.

One meeting per month (3 to 4 people for 1 to 2 hours) was held for supervisors, or managers as we like to call them. In this meeting the managers received instruction from the registrar/director of admissions. The managers' meeting included the registrar/director, the three area supervisors, and a secretary who took minutes.

The supervisors would then meet with their area staff in a monthly meeting (5 to 10 people for 30 to 60 minutes). Telephones and patron windows were covered by staff within our department. During this time, information from the managers' meeting was conveyed to staff. This way only topics that involved the staff in specific areas were discussed. If there were concerns about other areas in the office, the information was taken by the supervisor either back to the monthly managers' meeting or directly to the other supervisor if immediate attention was necessary.

Staff felt more comfortable discussing problems in the smaller meetings. They could provide agenda items prior to the meeting if they didn't feel they were attacking people in their area or those in another area.

Assistant Positions Established

From 10 fulltime staff, two management assistants were established (no money at first, but much more responsibility. That is how it usually is: first the responsibility, then someday the money). The change of registration and records supervisor to assistant registrar came about because of Touch-Tell Registration. A supervisor was no longer required in registration. But, because of expanding enrollment, it was necessary to have an assistant director of admissions.

The director of admissions meets with these managers for an hour the first of each month. Information that is dispensed from upper management is relayed. Problems and solutions to increase efficiency within the entire Admissions and Records Department is discussed. About 10 minutes is spent on supervisory skills using handouts, tapes, or just plain, good, old-fashioned experience gained from the director who has worked in these positions. If a consideration surfaces that needs brainstorming or is of interest to the department as a whole, it becomes an agenda item for the next general staff meeting. Please note that departmental work is not interrupted. Phones are answered, patrons are served, and routine work continues.

Assistants meet the next week at different times with their departmental area for approximately 30-minute meetings. Part-time staff, even work-study students, are included. One result is that our part-time staff are better trained and can provide better service now that they have the opportunity to attend staff meetings. Students/patrons receive service and do not have to return at another time. The meeting has a more positive focus for inservice and staff development.

During our separate department meetings, discussion is held for specific needs in our section. Staff members share ideas to motivate each other. Motivational signs are posted: "A smile neutralizes," "Grin and Bear It," "You never get a second chance to make a first impression," and "T.E.A.M. = Together Everyone Accomplishes More!"

Office doors are always open for questions or concerns. Problems are not restricted to staff meetings. There is an ongoing interchange with personnel. Again, there is no interruption of service. The windows and phones are covered by staff from other areas.

General Staff Meeting

At the end of the month, one general meeting is held for all fulltime staff. A nice conference room is reserved, one with comfortable chairs, a large conference table, and refreshments. (The cost is $15 a month.) We order enough refreshments for the part-time staff who are covering the office during these two hours. All staff, including part-time, receive minutes and copies of any handouts.

With one general staff meeting a month involving all fulltime staff, boredom is alleviated because the subject matter pertains to everyone and provides development opportunities.

We moved the "other" item to the beginning of the agenda. Doing this started our meetings with points that our people needed to discuss before they started on the planned agenda items. We also initiated an exciting agenda item that we call "Sharing Positives" at the beginning of the meeting. This helps our employees keep track of the positive things happening in their areas to share with others. For example, one student came back to the registration window, apologized for having acted rudely, and thanked the registration clerk for being understanding and handling a difficult situation in a professional manner. One of our registration clerks received flowers from a department secretary, thanking her for having been so helpful at registration. We realize that when we offer genuine service the results come back to us in a positive way.

Summary

Breaking down one major meeting into three meetings has been very successful (see diagram). The productive hours lost each month are minimal. Service, morale, and office interpersonal relationships improve.

Setting Up a Missions Statement

Dull is a good word for many meetings. The need for change was discussed throughout the department to see if ideas for a missions statement could be gleaned. Once ideas were compiled, an ad hoc committee from the department was organized to formulate a missions statement everyone could accept. They came up with the following:

> The mission of the UVCC Admissions and Records Department is to treat students with respect and a willingness to serve by going the extra mile. We will convey information to the students that will help them succeed and feel positive about their association with Utah Valley Community College.

They also came up with the slogan, "The Quality Service with a Sincere Smile." This process was a great success because the whole department had a part in the procedure, and, therefore, all were willing to support it.

Steps

While the ad hoc group worked on the mission statement, other managers were brainstorming for ways to enhance staff meetings. They came up with the Self-improvement Through

Education and Personnel Strategies (STEP) program to support the idea that we wanted to improve ourselves and our staff through education—not only professionally but also through personal development.

With this in mind, three areas were created: 1) Health—Mental and Physical, 2) Intra-office Relationships, and 3) Meet the Department. One of these topics is covered each month with three socials per year. The February social is a very nice dinner with partners. July's is a barbecue in the director's backyard, with partners invited to share in the games. The December social, for employees only, is a traditional fondue luncheon.

Regular staff meetings are held during the other months. Guest speakers are arranged by a coordinator assigned to each topic. All speakers are chosen from the excellent faculty and staff on campus. Guests take up to 45 minutes per subject. The meeting is held in a room away from the office area. Light refreshments are provided during the presentation, so all are relaxed and enjoying themselves as they learn. The refreshments are delivered from the cafeteria. The director's secretary prepares an agenda and adds a little saying or comic to put smiles on people's faces right from the start.

Some great subjects presented under each area include the following.

Health—Mental and Physical

- The benefits of exercise and the adherence to what we know is good for us. (Here we do some deep breathing techniques to help relieve tension.)
- Being mentally prepared in the office. How to be mentally and physically fit: remember balance in all we do. (An aerobics teacher comes to present this. She even gets up on a table, demonstrates a few exercises, and explains how they affect your body.)

Intra-office Relationships

- How we each perceive things differently.
- Communication: what makes it difficult, and how important it is that we communicate with each other and with other offices.
- Dealing with conflict in and outside the office.
- Teamwork and the success that comes when a group of people work together toward an identified goal.
- Personal characteristics: how we are and how we would like to be.
- Handling stress in our lives, both at work and at home.
- Understanding reasons why we act and react.

"Meet the Department"

- Key people from another office on campus are invited to talk about their department, which is an eye opener each time. This helps staff appreciate what others do and gives them a better idea of what they can offer to students. It gives staff a chance to voice

any concerns about the other department, and vice versa. Departments that have exchanged information include:

- Auxiliary Services and Student Life
- Financial Aid
- Continuing Education
- Computer Services
- College Relations
- Cashier's Office
- Academic Advising
- Turning Point/Center for Personal and Career Development
- Career Center

Through "Meet the Department," staff find that various other offices handle a lot more than meets the eye. For example, the meeting with the Financial Aid Office disclosed the complexity of the federal regulations that office is required to handle. As they discussed various items, we came to realize why we were required to have certain fields on the application and why input was needed on our end. When we are able to understand why some things are done the way they are, it makes it easier to support them. "Meet the Department" helps staff understand and support other departments on campus. It leads to better service. Familiarity with each office and what it handles allows staff to refer students and others to the office that is able to meet their present need.

We are contemplating the addition of a new area entitled "What's New: Career Updates." Under this field, new techniques in WordPerfect, electronic mail, computers, and anything else that can help us be better informed and aware of possibilities that we may want to use in the future will be explored. We will also be adding a time to share "Positives" again to help us all look for the good and to work for that compliment or reward.

After the guest presentation, "Other" is the next agenda item. Moving it up on the agenda enables everyone to feel he or she has the time to talk and that it is important that we hear from them first. This used to be the gripe session "For Your Information," but is now an informative time we all enjoy. People can bring up anything they would like to discuss. They may share information or tips and ideas they acquired when they attended a recent seminar or conference.

Once "Other" is covered, the director discusses upcoming items, changes, etc., and then an "Inservice Message" on various topics is presented.

- Accept a challenge and learn from it
- Take a chance
- Welcome constructive feedback
- Be productive
- Be in control
- Time management
- Stress (Of course, the whole underlying idea for staff meetings is to relieve stress in

some way or another.)

Sample 1: Accept a challenge and learn from it.

In our field of business it has become hard to keep up with all the changes. As soon as a new computer is out on the market it is outdated by newer technology. With this going on day in and day out, we do not have time to stop and realize that we can and are making a difference. Oftentimes we feel we are spinning our wheels, or we feel like the poster that reads, "I'm so far behind, I think I'm first."

In order to keep going we need to realize that most of the challenges we face and are able to deal with will help us to be better people/employees.

> Many years ago, golf balls had smooth covers. Then somebody discovered that after a ball was roughed up you could hit it farther. So they started manufacturing golf balls with dimpled covers. Same thing in life—it takes some rough spots to make you go your farthest.
>
> *Leadership...with a human touch* (January 21, 1992)

Sample 2: Take a chance.

Do not be afraid to take a chance; at least tell yourself that you will grow from trying. No matter what the outcome—do it anyway.

ANYWAY

People can be unreasonable, illogical, and self-centered—but love them . . . Anyway
Do good for others, and your motives will be suspect but—do good . . . Anyway
Small men with big ideas can be discouraged by big men with small minds—but think big . . . Anyway
Give the best you have to give and people will find fault—but give your best . . . Anyway
What you spend years building may be destroyed overnight by well-meaning, thoughtless people—but build . . . Anyway
If you are successful, you will win false friends and true adversaries—but succeed . . . Anyway
Question authority and you will stand alone—but ask . . . Anyway
The good you do today may be forgotten tomorrow—but do good . . . Anyway

—Jim Vandenberg

Sample 3: Welcome constructive feedback.

We can work with others towards a win-win result in any kind of work project. Sometimes it helps to have someone give you suggestions and feedback. How many times have we felt we had the answer and excitedly shared it with a mentor, only to realize, after questions had been asked, that changes needed to be made or that something else would work better? If we work with others, we can receive constructive feedback as the project goes along. We may come up with a better conclusion without having to change the final product. Working with others, or at least getting their input, will help us to be winners.

Winners and Losers

A winner is always part of the answer;
A loser is always part of the problem.

A winner always has a program;
A loser always has an excuse.

A winner says, "Let me help you;"
A loser says, "That's not my job."

A winner sees an answer for every problem;
A loser sees a problem for every answer.

A winner says, "It may be difficult, but it's possible."
A loser says, "It may be possible, but it's too difficult."

BE A WINNER!

Sample 4: 'Bee' Productive.

If we try to do out best, we will always feel good about ourselves. When we spend time shuffling papers, wandering around, etc., we usually feel "down" and are not efficient.

Sample 5: Be in control.

Prepare ahead of time for situations you may find yourself in (e.g., dealing with irate people, being accused of something you did not do, admitting to mistakes, etc.). If you think through situations, decide how to handle them, and review your thoughts, you will be ready when you are confronted.

Consider the hammer—
It uses its head.
It keeps pounding away.

It doesn't fly off the handle.
It finds the point and drives it home.
It makes mistakes, but when it does, it starts all over.
It's one of the few knockers in the world that does anything constructive.

After the inservice message we take a few minutes for further comments or ideas that have surfaced during the meeting and then close. Meetings are now positive, energizing, help us get the work done, and fun!

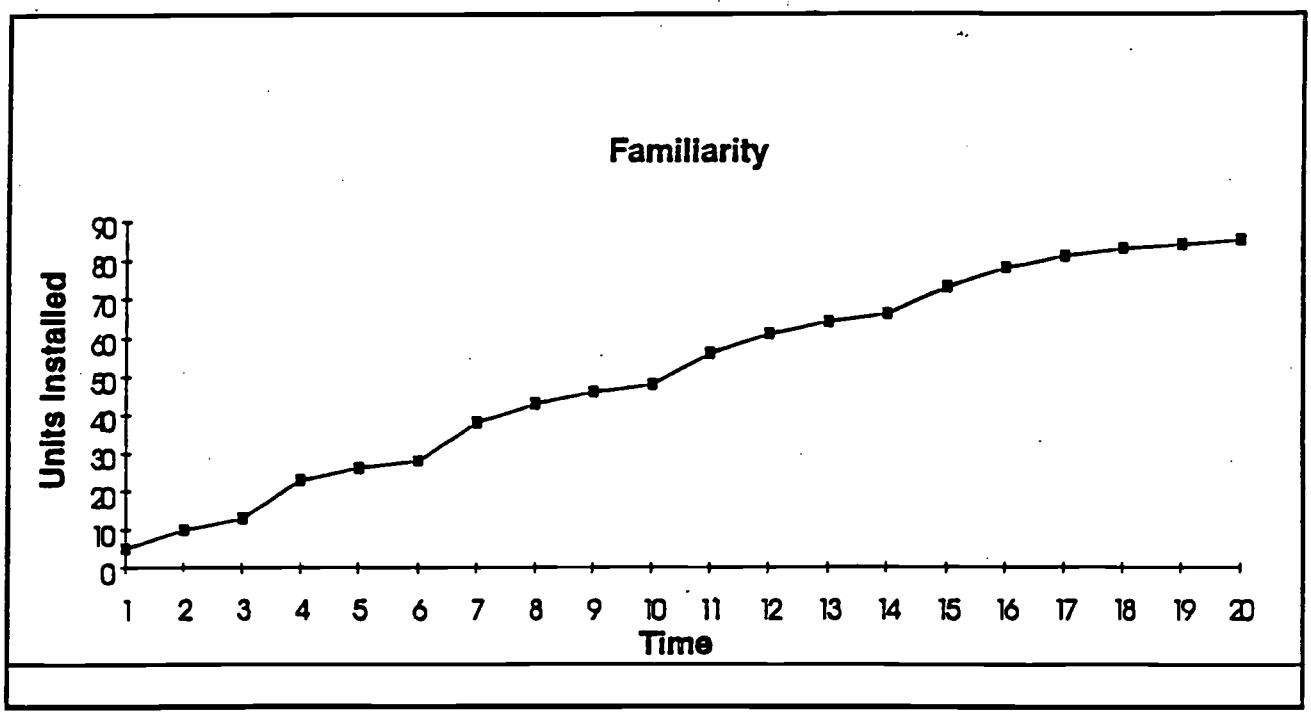
Selling SPEEDE/ExPRESS

Laura McCain Patterson
Registrar
University of Michigan

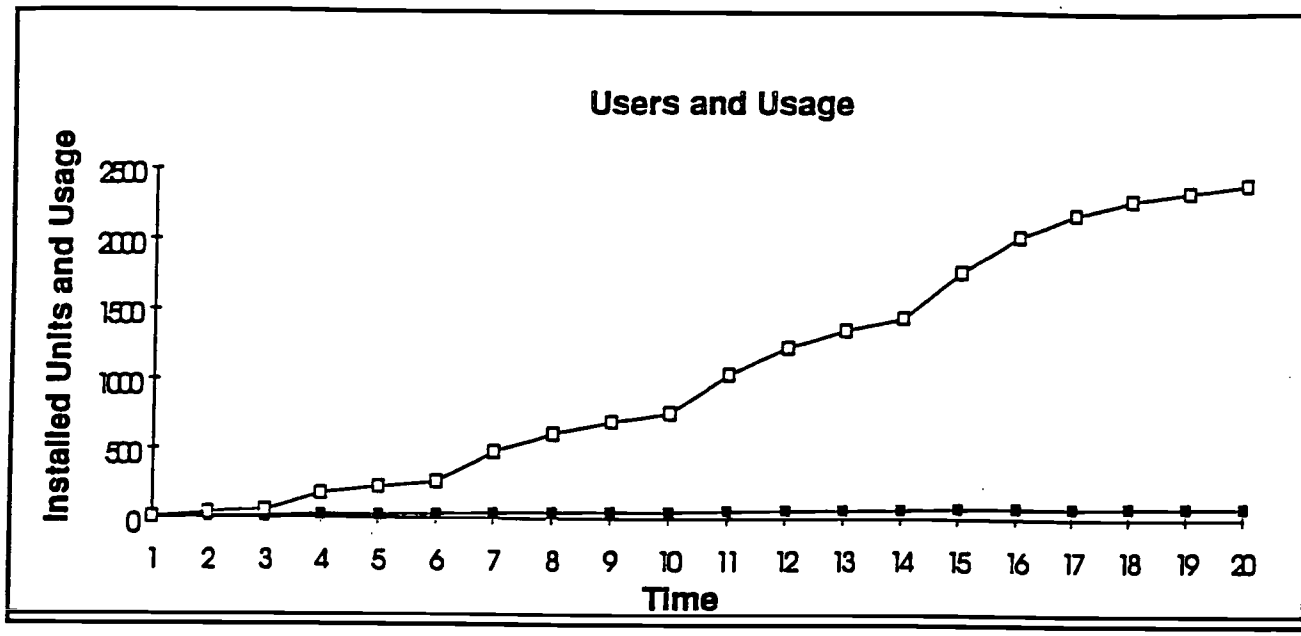
Thomas J. Scott
Acting Director, Office of Information Systems
Systems Administration
University of Wisconsin

Introduction

SPEEDE/ExPRESS, even after being around for a few years and being endorsed and implemented by some significant experimenters, doesn't yet enjoy universal acceptance. Why is that? In part, we think it has to do with a certain familiarity curve that we've invented. The values on this graph are time on the X axis and experimental users on the Y axis.



Note that the curve on this graph is an incremental step function. In simple terms, this means sites install and begin to work with the product in clusters or clumps. These early users are mostly experimental in nature. Many institutions continue to sit by and await the outcome of this early work.



Note what we think happens when we add actual use to the graph. At each succeeding iteration, several more sites begin use while the previous group continues to expand their usage. And yet, many are still waiting and watching. Over time, most of the institutions identified in our chart will switch from experimentation to production. There is, of course, another phenomenon at work here; while the tail end of this use wave waits, the front edge evolves further to other technologies. Therefore, what seems new and frightening to some is 'old hat' and boring to others. What we want to do is move as many institutions to the front edge of the wave as we possibly can. Why do we want to do that? The answer to that question is, in part, why we are here today.

The Set-Up

We have established three separate staff groups. We will call them an average admissions/registrar's office, an average data processing office, plus a better-than-average high school. These staffs are going to think, speak, and behave in normal fashion. There are going to be risk-takers and comfort seekers in the groups. There are going to be cynics and Pollyannas. In short, they are going to look, sound, and act much like we all do every day.

[Stage] Eight people are sitting around a table wearing huge name collars that identify them as Sarah, Mike, Dave, Judy, Josh, Michelle, Jim, and Colleen. Three are obviously registrar/admissions types, while three are clearly from the DP shop. The other two are hard to exactly place but they appear to be from a technologically correct high school in the area. There are two moderators standing off to the sides, waiting for someone to say something. The AACRAO folks make shuffling sounds as if they want to be first to open a dialog. The DPers, sensing that they may be left in the dust again, jump up to address the issues but are beaten to the punch by Jim and Colleen from UpTech High School.

Colleen. We have to get our big receiver colleges and universities moving on this SPEEDE thing, Jim. We keep churning out these paper transcripts like we've been doing for an eternity. I thought you said that after our last program update we would have SPEEDE capability inhouse. I want us to switch over NOW.

Jim. We can do SPEEDE. It's the colleges, dragging their feet. I got a call the other day from Still-in-the-Dark State. They were surprised that we even knew about SPEEDE. When I told them we would like to send our transcripts to them EDI (electronic data interchange), they hung up.

Colleen. Great! Sounds like we'll have to drag them along on this one, too.

Could this happen? Sure! One of the reasons many colleges and universities hold back on SPEEDE/ExPRESS is their concern that their feeder schools won't be able to send electronically any time soon. So why rush? As our little play suggests, this may not be true. Software developers in Wisconsin are incorporating SPEEDE/ExPRESS into their school district products for use in Wisconsin, Illinois, Iowa, and Minnesota. These products are in testing now with plans for delivery this calendar year. Wisconsin may be ahead of the pack in many areas, but we doubt that we are this unique. Your high schools are probably having serious discussions about SPEEDE/ExPRESS now. You must be ready.

A different question is how high schools will send transcripts. Will they use a VAN (value-added network), the Internet, or will they dial? We don't know. But we do know that you can help them decide.

The SPEEDE list-serve was very active this year with this very question. One answer suggested was to create technical partnerships between the high schools and their receiver college or university. High schools and their partner colleges or universities then decide on the best and most mutually beneficial way to start sending. That may mean hosting the high school as a 'back-door' node connection into the internet either with a direct connection into the campus or with a guaranteed high speed dial port. The pay back to the partnership will be more SPEEDE/ExPRESS transcripts, lower processing costs, and fewer errors for the admissions office.

[Stage] The registrar, Sarah, and her assistant, Dave, are talking with the undergraduate admissions director Mike.

Sarah. Well, Dave, what happened when you called UpTech High the other day? We were going to find out about their willingness to get involved with us on a SPEEDE pilot, weren't we?

Dave *(obviously very nervous).* It was kind of confusing, actually. I spoke with that Jim guy who handles their technical stuff and he said they were ready with EDI. Just as he said it, though, the line went dead, and I haven't had a chance to call back since.

Mike. What did he mean by ready? Can they really do it? Jeez, we better call the DP folks and get them moving. They've been saying it would be years before UpTech, or anyone for that matter, would be willing to get started with this EDI stuff. Do you know how much money we could save! I got hit with another 2.5% budget cut the other day and it had to come from staff. I just can't afford to do all this manual stuff with transcripts. It's killin' me.

Sarah. Tell me about it. We buy special paper. We buy special signature hardware. We keep some old impact printer from DP running constantly just printing the damned things. Then we spend a small fortune mailin' 'em out just to get calls from the schools we send to, asking about every question you can imagine.

Mike. I can imagine all right. What do you think we do all day? A staffer wheels in the day's mail and we start trying to understand transcripts from all over the country. It never ends. Open, sort, stamp, read, think, question, call, key! And the calls we get wanting to know if there has been an admission decision yet. It's enough to drive us nuts. I thought I read where SPEEDE could help us with all this!

SPEEDE/ExPRESS to the rescue! You thought SPEEDE would help? You bet SPEEDE will help. We are going to present the many ways SPEEDE will help, so that you can make these same arguments to the doubters on your campus.

1. **SPEEDE/ExPRESS reduces transcript production costs.** We are not suggesting that a SPEEDE transcript will cost less than 29 cents. But mailing a paper transcript doesn't cost 29 cents. In determining the cost of mailing a paper transcript from your institution, you need to include the cost of the special security paper and the envelopes preprinted with your return address. Add the cost of your validation machine, including the maintenance contract. Remember to include the staff time to print (or photocopy) the transcript and validate it. Then add the value of staff time needed for handling the transcript, preparing it for mailing, folding, and stuffing it into an envelope. That transcript costs much more than the 29 cent stamp which goes on the envelope. George Hammond from the Registrar's Office at Queen's University recently reported that it currently costs him just under $4.00 to produce a paper transcript. His estimate included forms costs, computer charges based on his computer center charging algorithm, and direct staff time to process orders, check output, fold and stuff, and mail. Brigham Young University reports that after implementing SPEEDE with just one institution (one of their major feeder junior colleges), they have saved on transcript costs. And don't forget that as your SPEEDE volume increases, you'll be sending fewer transcripts through the U.S. mail, which will be another source of savings.

2. **SPEEDE/ExPRESS significantly reduces the cost of handling incoming transcripts.** In fact, the benefits from electronically receiving transcripts will exceed the benefits from sending. What does it cost your institution to receive and process transcripts? The analysis includes the time allocated for opening the mail, date-stamping and sorting each piece, as well as the incredible amount of time needed to interpret the information on the record, key the information from the transcript into your database, and validate the data

entry against the paper document. The data once stored electronically in someone else's computer is printed onto a piece of paper specifically so you can put it back into electronic storage. The collective inefficiency is staggering.

3. **SPEEDE/ExPRESS improves communicating the content of the record**. A common format for sending and receiving transcripts will mean an end to the gibberish in our current records. Many high school transcripts are especially difficult to read. Even if all you do when you electronically receive a high school transcript is print it, you can print it in a common format that you design. Having the same data element appear in the same spot on every high school transcript would surely result in a significant reduction of time spent by those persons evaluating records for high school units completed.

4. **SPEEDE/ExPRESS improves the service provided by our offices**. The end of the gibberish can result in faster evaluations and faster admissions decisions for new freshmen. For transfer students, transfer credit evaluations can be processed more quickly. The impact on graduate and professional school admissions can be even more dramatic, since the records being evaluated by those units typically contain, at a minimum, four years of university-level work.

   Service will also improve for outgoing transcript production. The faster production of outgoing transcripts means faster turnaround on transcript requests. The clerical and data entry staff in the Admissions and Registrar's Offices who currently spend their days sending, receiving, and rekeying transcript data can be retrained for more challenging, rewarding positions in areas of student service (such as marketing, recruitment, orientation, and advising.)

   The improvement in delivery of service resulting from SPEEDE/ExPRESS alone is enough justification for implementation. But the potential benefits from interfacing SPEEDE with your other student systems are even more powerful. The possibilities are tremendous. John Student at Another U can ask to have his transcript sent to you. You electronically receive the transcript in the SPEEDE format and feed it to your transfer credit evaluation system. The result of the transfer evaluation can be fed to the degree audit system. You make the degree audit and transfer evaluation available electronically to John, who, while still at Another U, can access the information electronically along with catalogue and timetable information available on your campus-wide information system. You provide almost instantaneous service and the student never even steps onto your campus. Of course, the scenario can be continued through registration and fee payment, and can include an application for admission, submitted electronically, to start the entire process. But however grand the scenario, the point is that the electronic sending and receiving of transcripts doesn't just make things easier for the Admissions and Registrar's Offices. SPEEDE/ExPRESS will improve the service you deliver.

5. **SPEEDE/ExPRESS increases security**. The idea of transcript information leaving our offices in an electronic format raises the anxiety level of registrars more than a little. But let's think about our current environment. How secure are we now? Every time a person handles a paper transcript, an alteration is possible. And don't be fooled into thinking that

safety paper and embossed seals really improve our security. The potential for falsification of paper records has never been greater due to desktop publishing, laser printers, color copiers, and image scanners. We presently don't know for certain that the transcript from Another U is authentic. How many transcripts from institutions outside your home state can you recognize on sight? How many other institutions' grading systems do you know? Do you check the name of the registrar on a transcript against the *AACRAO Member Guide* to verify that the signature on the record is truly that of the registrar at the institution which sent you the transcript? And how many university seals can you verify as authentic?

Electronic transmission of transcripts includes an acknowledgment and receipt system which enables you to know if a transcript purporting to be from your institution has been received at another institution. If acknowledgment arrives for a transcript you did not send, you will be alerted immediately so you can investigate the possible misrepresentation of academic data. The electronic logging of all incoming transcripts allows Admissions Offices to keep audit trails of received documents, which is virtually impossible in a paper environment. SPEEDE can move us out of our presently insecure environment to one which only the most sophisticated tamperer can deceive by using communication (electronic) between sending and receiving institutions.

Network security is not something to be taken lightly. Determine the level of security you will require and implement the appropriate measures necessary to achieve that security. Don't accept transcripts from institutions that don't employ acknowledgment and receipt, unless you have made some other trading agreement that satisfies you. The security concerns are important but they can be satisfied. And when they are, our transcripts will be more secure than they currently are.

So, Mike is right. SPEEDE/ExPRESS can help us. And it can help our students, too. In selling SPEEDE to your institution, you can address the benefits of reduced costs, improved processing, improved service, and increased security. But experience shows your presenters that even after you convince folks SPEEDE/ExPRESS, in theory, is a good thing, it's an even greater challenge to get it into the priorities of new system development and to make it a reality.

[Stage] Judy, Josh, and Michelle are going over the quarterly plan. The plan, as usual, has more days scheduled than staff have available and needs more money than the federal deficit. Josh is the director, Judy is the assistant director for technical support, and Michelle is responsible for the student records system. Judy speaks first.

Judy. Hey guys, my group has been playing with the SPEEDE/ExPRESS thing in a micro for a few weeks and it looks pretty stable to us. We think we ought to get the student folks over in Admissions and the Registrar's Office involved as soon as possible.

Josh. I'm interested in helping them out over there, but let's not get their hopes up, okay? You go over and say things like "stable" and "works pretty good" or "how

about a pilot" and they're going to think we've got a production bullet proof system ready for them. No, I want to help, but let's be careful here.

Michelle. Come on, Josh. They're not kids, you know. If we say pilot, they'll hear pilot. They know more about this than we do. We got into SPEEDE just a year or so ago, remember. We keep doing estimates of efforts, and they keep pointing to other institutions all over the continent who have put SPEEDE into production in the last year. I think we look pretty bad here. They could be saving real money and offering better and faster service and all we do is keep pushing out estimates of effort. Let's put Judy's stuff over in Mike's office and give it a whirl.

Is this a typical conversation? In too many cases, maybe it is. SPEEDE/ExPRESS users suffer from some fundamental misperceptions common to many technological advancements. And there are many who prefer to stand on the sidelines, calling the misperceptions problems, waiting for them to be solved by others. We could be talking about cars at the turn of the century, airplanes in the 1920s, or electronic data networks in the 1970s and 1980s. SPEEDE/ExPRESS suffers from the typical issues facing most new ventures:

* It's new and different.
* It requires some coordination.
* It sends important documents out of the institution on something other than paper.
* It fixes something that doesn't ***appear*** broken.

Our observation is that there are *NO GOOD* reasons to miss out on SPEEDE. But just in case someone believes there might be, let's run through the most common arguments.

Code tables! There are so many code tables! Who is going to standardize the code tables? The simple answer is no one. Instead, SPEEDE has you specify the codes you use, and AACRAO supplies a cross-walk table in digital format that lets your technical staff move from code to code pretty easily.

VANs or the Internet — won't someone just decide? Many of us have decided. There have been some successful tests using VANs (most recently involving University of Texas Austin and Arizona State University, March 1993). There are also some production examples using the Internet. If you are waiting for the ultimate answer on the network issue before adopting SPEEDE, then SPEEDE is going to pass you by.

The simple answer to the network issue is that various forms of sending a SPEEDE transcript from place to place are going to coexist. Choosing the right network solution for your situation probably means knowing your exchange partners and what they are going to expect. Wisconsin is going to use the Internet. Canada seems to be using the Internet. Others will use VANs. This is not an impasse. If you choose to use a VAN and a University of Wisconsin institution must send you a transcript, it will most likely show up in your U.S. mailbox as paper. This is no worse than what you deal with now. The same will probably apply in reverse, of course. Eventually the VANs will recognize that an awful lot of traffic is moving on the Internet and that they risk losing clients to that network. At that point they will offer gateway services between their VAN and the Internet.

Just what does my DP shop have to do to make this work? The DPers must look into the processes now in place for dealing with transcripts, both on the send and receive sides.

Let's consider the send side. A student requests that a transcript be sent to the University of Wisconsin-Madison. That request is processed by someone, probably in the registrar's office. The request eventually becomes a transcript which with signature and seal is stuffed into an envelope and sent to UW-Madison. For the most part, the DP effort involved in printing the transcript is what is involved in creating the SPEEDE equivalent. The printed version requires identifying the student, finding all the data elements maintained for transcript purposes, and formatting those elements for printed output. Everything but the printing must still happen. But, the final product is coded into a SPEEDE form and made available for electronic sending to UW-Madison rather than printed.

Let's look quickly at the receive side of this process. You send UW-Madison a paper transcript. Someone opens that envelope, recognizes the transcript for what it is, and logs its receipt. Various others will handle this document over the next few days or weeks, and the data printed on it will eventually be keyed into the UW-Madison computer. (Had you sent a SPEEDE transcript, the data would immediately be available for processing because it was received in digital format.) Had this been a SPEEDE/ExPRESS transcript, the DP shop would decode the SPEEDE format and select from the SPEEDE file those data elements your admissions office needs for its processing and decision making. A quick guess would suggest that the files you already maintain with data keyed from paper transcripts will be your starting point for SPEEDE extracted data. Therefore, much of the effort of the DP shop to support those files is reusable.

A point to consider is that right now we send and select for use data elements that we need for unique transcript needs. To substantively add elements from incoming transcripts to help in admissions decisions is expensive. Not only would you have to write new programs, but you would also have more keying to do. In the SPEEDE environment, the keying is done already. Therefore, if you wish to add elements from transcripts, you just ask DP to fix the programs you already have.

How much is it going to cost to write this translation software? We can't tell. It depends on your approach. At Wisconsin we spent $25,000 to get a set of programs which would extract elements from student records and format a SPEEDE file ready for transmission. We sent another $25,000 for a set of programs that accepted a SPEEDE file, decoded it, and then printed the pseudo transcript. This combined $50,000 provides just the encode/decode and print functions. There is no activity log, no network interface, and no method of student selection. In addition, there is no provision for dealing with other SPEEDE-related transaction sets including transcript request (146), transcript request response (147) or transcript acknowledgment (131).

For between $5,000 and $10,000 you can buy all the above. Vendors (Supply Tech, Ann Arbor, MI; SCT, Rochester, NY; IBM; and DEC) offer translator software which removes almost all of the burden of dealing with electronic data interchange (EDI) and transcripts. Essentially, you provide the data elements in fixed locations in a flat file to the translator software. The software then builds a SPEEDE compliant file, and ships it off to the receiver. On the other end, the software accepts the SPEEDE file and decodes it to your flat file. The products are available on just about any platform, from micros to mainframes.

Our recommendation is to call your favorite vendor who can deal with your computer system and your network issues. You can't afford not to call.

When will all this whiz-bang stuff be there for me? If you remember our introduction, you'll recall we spoke about waves of technology. One of these waves is crashing on your beach as we speak. There are a number of institutions now operating with SPEEDE as a central element of their production transcript processing. UW-Madison Undergraduate Admissions is accepting SPEEDE transcripts right now on the Internet. UW-Madison expects to be sending Internet transcripts before the end of the year. Other examples abound: Brigham Young University, Arizona State, UT-Austin, Miami Dade Community College, and Carlton University. Entire states are moving on the idea. In the last four months Minnesota and North Carolina have mounted impressive workshop efforts to start the process. Last summer both Illinois and Oregon got started on significant projects. Our suggestion is, "Don't get left behind."

[Stage] The eight people are now part of a single meeting and are exchanging their views. Mike, the admissions director, is speaking:

Mike. I want to thank you all for coming here today to discuss the SPEEDE implementation. As I think about the work we've done together over the last few months, I am really impressed with what we've accomplished and a little ashamed we waited so long to get this far. From my perspective, I wish we had done this a year or more ago. The transcripts I'm getting from UpTech are just superb. Having them in digital form has allowed us to reorganize the way we do things in Admissions along lines we've only dreamed of for years. I'm also really amazed at how many other institutions are sending us SPEEDE transfer transcripts.

Sarah. I want to add my two cents in here, too. I'll admit that we weren't too keen on SPEEDE in the beginning. But that was a mistake. Sending our transcripts using EDI has opened our eyes to other processes we can automate in my office. Not only does SPEEDE work well, but it's saving us money and allowing us to be much more efficient.

Josh. I have to agree with Sarah, at least on the "not too keen part." My division dragged our feet on this, too. Our technical folks were sold on the concept and the products from the beginning. But when you face constant tight dollars and too little staff your first tendency is to push your head a little further into the sand. I'm awfully glad we wised up fast enough to get involved. We may start using EDI for some of our financial transactions now that we understand it better. The potential savings to the university are pretty dramatic.

Colleen. From the high school perspective, we are pleased that you wised up too. SPEEDE submission of transcripts represents a big service improvement to our students and reduces work and effort for our staff. But we don't intend to stop with transcripts. We are really interested in the electronic transmission of admission applications too. The last SPEEDE task force conference was beginning to discuss that transaction set in some detail. Admission applications linked with electronic transcripts will really be a big boon to our students.

As we leave our little group of mostly fictitious characters, we want to remind you that, if you participate, you reap the rewards. If you wait, you and your institution will have to play catch-up.

Advisement and Registration: A Terminal Solution

Gregory Wist
Senior Registrar
Borough of Manhattan Community College

Gerhart Bolli
Director, Admissions, Records, and Registration
Snow College

Paul Rasmussen
Director of Advising
Snow College

Cless Young
Director of Computer Services
Snow College

Borough of Manhattan Community College

Introduction

In 1988 Borough of Manhattan Community College (BMCC) instituted a computerized advisement/registration system, a system it has been refining ever since. This in-house computerized system, was tailored to BMCC needs, the problems encountered, and plans for the future. It has had a direct impact on student success. It was developed by administrative and computing staff, working with both Registrar and Academic Affairs Offices. The observations, data, and other information on the registration and advisement process will be reviewed in this paper.

Institutional Profile. Borough of Manhattan Community College is a campus of The City University of New York. It is the largest of The City University community colleges and the only one situated in Manhattan. BMCC is an open admissions institution, and attracts almost 15,000 students in credit programs each semester. In addition to serving students from all five New York City boroughs, it has a foreign student population which currently represents 97 countries. In terms of race and ethnicity, 55% of the student body is Black, 29% Hispanic, 7% Asian, and 9% Caucasian and other ethnic groups. Almost two-thirds of the students are women.

One of the educational issues faculty wrestle with is how to reinforce the basic skills needs of students across disciplines. Many of BMCC's students come to college lacking a strong academic background. Faculty have developed well-defined sequences of courses in reading, writing, mathematics, and English as a Second Language. Twenty percent (20%) of entering freshmen hold GEDs rather than high school diplomas, and only 38% of entering freshmen have achieved a high school average of 70 or better. As part of The City University of New York, BMCC participates in a mandatory Freshmen Skills Assessment Program. All entering students are assessed in areas of reading, writing, and mathematics. The results of those assessments indicate that 70% of the students are placed into one or more remedial classes.

Another issue BMCC faces is how to facilitate student transition to college. Fifty-one percent (51%) of the student body are part-time. Twenty-eight percent (28%) are supporting children. Sixty-eight percent (68%) are receiving fulltime or part-time financial aid. For many students English is not their first language, another significant factor. Almost 50% of the students come from homes where one or both parents never completed high school. Many are the first in their family to attend college. Because BMCC serves the entire metropolitan New York area, it is not unusual for students to travel one to two hours one-way to attend school. In short BMCC is a typical urban college, whose students have responsibilities, family obligations-a whole range of factors that can compete with, distract from, or become a barrier to their achieving their academic goals.

In terms of programs of study, BMCC offers 18 curricula leading to the associate degree. Over half of its students enroll in business-related curricula (accounting, business management, data processing, and office administration). The other two significant areas of enrollment are liberal arts and a number of health-related curricula: nursing, respiratory therapy, medical records, and EMT/paramedic.

Advisement

In both the advisement and registration processes, there have been significant changes since computerization occurred in 1988. The first academic key to the advisement process is the basic skills assessment, cited above. BMCC has a fairly structured track for entering students to follow. After admission to the college, students take the mandated assessment of basic skills. At that point students with remedial needs have the opportunity to address those needs prior to enrollment in college.

Pre-Freshman Program

BMCC college supports an extensive Pre-Freshman Immersion Program-primarily in the summer, but on a smaller scale in January intersession as well-which offers freshmen an opportunity to take some of their required remedial classes free, in advance of their actual enrollment in the college. The Pre-Freshman Program has been a university-wide initiative, though our particular campus has developed by far the largest such program in the university. The program is offered in an intensive six-week summer session, and its components include:

- small class size
- a teaching assistant (tutor) in every class
- a counseling/orientation component that is integrated with instruction
- a theme approach across the curriculum
- advisement and preregistration in advance of regular freshman registration
- student incentives, including books, snacks, and transportation
- a sense of community that is otherwise difficult to foster in a commuter college.

BMCC's Pre-Freshman Summer Program has grown from 70 students in 1987 to over 1,300 this past summer. Over 95% of the participants complete the program. Data shows that program participants are retained after three semesters at a 20% higher rate than

nonparticipants. This program is one factor that has led to an increase in the overall retention rate within the institution.

Basic Skill Prerequisites

Another way in which the academic needs of students have been approached is through BMCC's basic skills prerequisites. Every course offered in the college has defined reading, writing and (when appropriate) mathematics levels that faculty have established as the minimum required for success in a course. A history course, for example, has defined reading and writing levels which serve as prerequisites to enrollment, but no mathematics level. Economics, on the other hand, has all three.

The basic skills levels are defined in the terms of the Freshmen Skill Assessment Program cited earlier. BMCC's computerized advisement/registration system reads the student's assessment scores and either permits or prohibits registration in a given course, depending upon whether the student meets the basic skills prerequisites for that course. That requirement is, of course, in addition to any regular course prerequisites. That is true for nursing courses, science, math-for every course offered at the college. In addition to being programmed into the computer, these prerequisites are also published in a Basic Skills Guide. The establishment of these prerequisites has been one step in ensuring that students are entering classes for which they are prepared. The following discussion looks at how this kind of academic policy fits into an overall approach to advisement.

Academic Advising

Academic advising at BMCC is a contractual obligation of fulltime teaching faculty. The traditional approach had been to establish a six-week period at the close of each semester during which students would be advised by faculty in their particular curriculum. Students were asked to bring with them a copy of their transcript and a copy of their assessment scores to ensure accurate advisement was based on up-to-date data. All too often, unfortunately, faculty proceeded with the advisement even in the absence of this data for courses for which they had not met the basic skills prerequisites. In the past, students received a curricular checklist from the faculty member and filled out a registration form which could then be used during the next semester's registration period.

Advisement Data Sheet. BMCC's current process closes such loopholes to accurate advisement. One of the primary changes has been the use of an advisement data sheet (ADS). The ADS is a computer-generated printout which includes the student's transcript, assessment scores, and registration form. These data sheets are printed by curriculum, and distributed to appropriate departments. As the student comes for his/her advisement appointment, the faculty member gives the student the ADS. All necessary data is available to both student and adviser. This information is also available on computer terminals in each department and in several different versions:

1. There is an assessment scores-only screen, which will list the current R/W/M placement, and also cite the date and score of every testing. On the ADS, only the

most recent placement and test score are listed.

2. There is a transcript-only screen, which lists all course taken with appropriate notations (dean's list, academic probation, etc.) in chronological order. This is the form of the transcript that currently appears on the ADS.
3. There is a combination screen, including both assessment scores and transcript, in the manner of the ADS. Here, however, the transcript is given in reverse chronological order, so that the most recent courses appear first. If the student has preregistered for the next semester, that preregistration (without grades, of course) will appear as the most recent semester.

The advisement data sheet serves as the core on which the advisement process is built. But BMCC has also changed other aspects of the process. Since seven of our departments now have the ability to do on-line registration in the departments, both the advisement and registration take place at the terminal utilizing the screens described previously. One of the benefits here-as in the registration process itself–is that students see the messages that impact their registration: lacking a prerequisite; class closed; etc. In fact, this reinforces what a data entry operator or, in this instance, an advisor/data entry person says to the student. Somehow the impersonal machine is much harder to argue with than a live person!

Faculty Training

A third change is the training that faculty undergo for both advisement and registration. BMCC's training has been both proactive and ongoing. It has included educating faculty about the overall process at general faculty meetings, more specific training readvisement at the departmental level, data entry training for those departments that are online, and follow-up visits to departments every semester to update faculty on any new initiatives and to remind them of problem issues.

During the initial phrases of implementation Academic Affairs staff met with faculty, usually by department, to review every step in the advisement and registration process. In addition, tutorial sessions were scheduled at computer terminals so that faculty could learn how to use the system for advisement. Even now, BMCC sends every fulltime faculty member, just prior to the preregistration and advisement period, a packet of advisement information which includes:

- the college catalogue
- the basic skills guide
- all dates for advisement and preregistration
- a listing of relevant academic regulations (such as recommendation policies and credit limitations for students)
- special advisement situations (such as modern placement, and internship)

BMCC follows that up with visits to departmental meetings to review process and to answer questions just prior to the advisement period. In short, it does everything it can to reinforce timely and accurate academic advisement as one of BMCC's top priorities within Academic Affairs.

BMCC continues to refine the advisement process. Two years ago the ADS was reconfigured to improve its usefulness as a gradation checklist. This version of the ADS was piloted in the accounting department and is now available in five curricula. The version is available as well on a terminal screen, as is a concomitant screen which will list those courses for which the student is qualified in the coming semester (last column). The online departments can move from the screen directly to the registration screen for actual data entry. Those screens, described earlier, that contain a chronological transcript will still be retained, for there will continue to be uses for that kind of context in the advising process.

BMCC continually assesses its advisement process to improve and refine it. There are clear advantages for students and some disadvantages, chiefly in terms of resources. They include:

Advantages

- Much tighter enforcement of academic policies (basic skills, curriculum-specific requirements, credit limits [probation], etc.)
- Improved retention
- Better trained faculty (computer skills, utilization of student data, knowledge of general academic policies as well as other disciplines not their own)
- Better scheduling of classes
- Heightened awareness of the importance of advisement as part of the larger process

Disadvantages

- Labor intensive activity for Office of Academic Affairs (problem-solving, preregistration, central registration, department visits)
- Faculty who want to waive requirements
- Some faculty won't change (lack of computer skills, unfamiliarity with basic skills guide)

Summary

Borough of Manhattan Community College has developed an inhouse system, tailored to its needs, as one of the principal steps to enhance retention, the quality of advisement, and general awareness of academic policies. Its strengths are reinforced through the subsequent registration process.

SYSTEM CHECKS FOR

- Prerequisite
- Co-requisite
- Time Conflicts
- Closed Classes
- Impoundments—Bursar, Library, Admissions, etc.
- Immunization
- Test Scores—Remedial Placement

- Pairs
- Blocks
- Canceled Courses
- Academic Standing—Dismissal
- Probation limited to 12 credits
- Orientation course for new freshmen
- Previously passed courses
- Special course reserved for:
    - Evening Nursing Students
    - College Discovery Students
    - High School Students
    - 24 CC (GED) Students
    - Specific Curriculums
    - Special requirements for specific programs (i.e., 2.5 GPA for Nursing)
    - Credit and GPA limit for specific preregistration periods
    - Freshmen Exclusions
    - Remedial Prerequisites

Registration

BMCC's old system was a traditional class card system in which students went from table to table gathering cards. When they had enough cards, they turned them in and the Registrar's staff did some very preliminary checking. From a Registrar's point of view, it was a very simple system. In six days 12,000 students could be registered. However, from a student's point of view, there were many problems. Students registered themselves into conflicts. They registered into courses for which they did not have prerequisites or the right Basic Skills. They were really just grabbing cards that would fit into their schedule. And the Registrar's office handled a lot of add and drop during the first week of classes.

During the last Middle States visit, there was a recommendation made, and a planning committee was formed to look at advisement and registration. At the same time they were looking at advisement and registration, the administration was also deciding on some changes that needed to be made in advisement and registration. These changes, for the most part, matched the committee's recommendations.

BMCC's new system was fully implemented in the Fall of 1988 when the switch was made from cards to computers to improve advisement and registration. Colleagues at other institutions have suggested this checking is unnecessary; students should be allowed to register for those courses for which they have been advised. BMCC students, however, are not as well prepared as some students from other colleges and, therefore, the institution has elected to do this checking. Many BMCC students, especially the new freshmen, are required to register for pairs or blocks of courses specially designed for their needs. BMCC's system also checks for canceled courses, limiting students who have been placed on probation to 12 credits or hours. The orientation course required for new students, and classes specially reserved for specific groups of students, such as evening nursing students, or college discovery students, are also entered on the system. The system also checks to see whether a

credit and GPA limitation can be imposed for specific periods of registration. For instance, the first period of preregistration, BMCC only allows students with 12 or more credits and a GPA (grade point average) of 2.0 or greater into the registration area. It can exclude freshmen from certain courses. It can check to make sure students do not take more than 18 credits or hours. The same process followed in the registration area is also being used in the department areas. Eight of the departments have indicated their desire and willingness and are, in fact, registering students in their departments.

Overrides. The only way students can register with one of these conditions (checks) is to go to an override terminal. They need special permission for this. Not every department has override terminals. Overrides can be done in the registration area staffed by the Registrar's personnel and problem solvers who are faculty and staff from the Dean of Academic Affairs Office, where the student's form is signed if an override is approved.

Warnings. Warnings do not prevent the student from registering for a course but simply display a message that the data entry person gives to the student. Warnings flag courses with such cautions as "taught with computers" to alert the a student who has an aversion to computers, "open to only ESL students," "section is bilingual," or "special permission to register for courses required."

Scheduling. Figure 1 is an example of an actual screen for a student who has already registered for three courses and is now attempting to register for a Political Science course. The first problem for the student is that the course is closed. The first of three numbers after the word "closed" indicates the number of students who are currently in the class, the second number the maximum class size for this class, and the third number the actual room capacity. This number was added so that the chair people would not add students over and above the stated capacity of the room. The student's second problem is a conflict with the Blk-321 class on Thursday. A number of things can be done when this comes up; one of the important things to keep in mind is that the student is sitting right next to the data entry person and can see these messages. Figure 2 shows another screen that lists five Political Science courses. When the student indicates his preferences, the data entry person will move the course into the student's schedule with the cursor.

The auto scheduler (see Figure 3) will work out three potential schedules for a student or can block specific days or times and then reschedule a program for the student. This particular screen is extremely useful, especially during the last days of registration, when it is virtually impossible for a student to work out a schedule.

Figure 4 shows the student's registration: the courses, the rooms, a pictorial layout of the weekly schedule, how much financial aid is available, and what the actual bill is. The student is advised to pick up the confirmation and return to the data entry person if some schedule adjustments need to be made.

Preregistration for the Spring Semester occurs in November and December. Before the second phrase of preregistration (around January 13), anyone who failed a course was sent a letter (see document) advising them that because they did not pass prerequisite courses, they are not

Figure 1

```
                    Course  &  Section Selection  by CHECK02  WIST GREG
Student Id: [redacted]  FEMALE Age: 20          Class Code: 2199  NO A
      Name: [redacted]          Eq.Cr: 12.0 BEC BUSINESS MANAGEMENT
 COURSE DESCRIPTION  COURSE SEC  STATUS                    ERR+CNT OVER+ADVISE
==================== ========== ========================================
AMERICAN GOVERNMENT  POL100 111  CLOSED:28/28:28 + Cnf: BLK321 111 THU



                 <D> REGISTERED CLASSES in  ===> SPRING  <===
BLACK WOMEN          BLK128 122
AFRO-AMER WRITING    BLK321 111
INTRO TO ECONOMIC    ECO100 163



TIME CONFLICT IN WEEKLY SCHEDULE

CORRECT AND RE-ENTER
PF1:Auto 2:Open Sec? 3:Confrm  7:ADV I  8:ADV II                        12:ME
```

Figure 2

```
+-------------------------------------------------------------------------------
|   POL100 AMERICAN GOVERNMENT                        AVAILABLE SECTIONS: 5  / 9
|   OPEN SEC for [redacted] NICO  TIME + PRS CONFLICTS: 1   CLOSED: 3
+-------------------------------------------------------------------------------
SEC DAYS     HOURS     DAYS     HOURS      SEC DAYS     HOURS     DAYS     HOURS
-------------------------------------------------------------------------------
081 M     08:00-09:21 W     08:00-09:21
082 W     08:00-09:21 F     08:00-09:21
092 W     09:30-10:51 F     09:30-10:51
121 MW    12:30-01:51
161 MW    04:00-05:21



                                        (*): Blocked, (X): Addtn'l Days/Ti
Bring cursor to the desired section & <ENTER>       pf3:Nxt/Prv Pg.
```

Figure 3

DAY	EVE	TOT	COURSE	SEC	1	2	3
9	6	15	BUS104		101	071	112
15	6	21	MAT010		071	111	082
17	12	29	RDG073		080	081	082

TIME OF DAILY EXCLUSIONS

DAY	MON	TUE	WED	THU	FRI	SAT	SUN
DAYTIME							
EVENING							

3 SCHEDULES FOUND

	MON	TUE	WED	THU	FRI	SAT
-8:	MAT	RDG	MAT	RDG	MAT	
9:		RDG		RDG		
10:		RDG	BUS	RDG	BUS	
11:					BUS	
12:						
1:						
2:						
3:						
4:						
5:						
6:						
7:						
+8:						

	MON	TUE	WED	THU	FRI	SAT
		BUS	RDG	BUS	RDG	
			RDG		RDG	
			RDG		RDG	
	MAT	MAT		MAT		
	MAT	MAT		MAT		

	MON	TUE	WED	THU	FRI	S
	RDG	MAT	RDG	MAT	MAT	
	RDG	MAT	RDG	MAT	MAT	
	RDG		RDG			
		BUS			BUS	
		BUS				

Select schedule: PF1 PF2 PF3

11:Hourly Excl. 12:Registrati

Figure 4

BOROUGH OF MANHATTAN COMMUNITY COLLEGE - CUNY

THE FOLLOWING COURSES ARE RESERVED FOR SPRING 1991

COURSE	SEC	CRD	HRS	ROOMS	TITLE	CHECK02
BUS104	114	3.0	3	N408	INTRO TO BUSINESS	
MAT010	091	0.0	6	S754	BASIC MATHEMATICS I	
RDG073	110	3.0	6	N417 S500	RDG LAB LEVEL III	

[redacted] SONIA
[redacted]
55 E 102 ST/10F
NEW YORK CITY NY 10029

WDP 1199 M0 A
WORD PROCESSING

Original Reg.at: 12/19/90
Printed: 02:16 PM 12/20/90

BMCC CREDITS: 15.0 PELL CREDITS: 9.0 27.0 PELL ELIG: 0000

HOURS	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
00-08						
08-09						
09-10	MAT010 091 09:00-10:48		MAT010 091 09:00-10:48	MAT010 091 09:00-10:48		
10-11	. . . . .		. . . . .	. . . . .		
11-12		RDG073 110 11:00-12:24	BUS104 114 11:00-01:50	RDG073 110 11:00-12:24		
12-01		. . . . .	. . . . .	. . . . .		
01-02		RDG073 110 12:30-01:54	. . . . .	RDG073 110 12:30-01:54		
02-03		. . . . .	. . . . .	. . . . .		
03-04						
04-05						
05-06						
06-07						
07-08						
08-09						
09-12						

DEFERRALS	TYPE	FINANCIAL AID AMOUNT	APPLIED
VET:	TAP :	512.50	512.50
	PELL :	686.50	139.85
GEN:	CD :		
	OTHER:		
3RD:	TOTAL:	1,199.00	652.35

TUITION :	612.50
SAF FEE :	39.85
LATE FEE :	0.00
OTHERS :	0.00
TOTAL ======>	652.35
FIN.AID :	652.35
WAIVERS :	0.00
PAYMENT :	0.00

ESTIMATED TAP

PAY TO CASHIER: 0.00

IF YOUR BILL IS NOT SETTLED BY 01/24/1991 THIS RESERVATION WILL BE CANCELLED.
EVEN IF THE BALANCE DUE IS ZERO. YOU MUST SEE THE BURSAR
[illegible]

permitted to take certain classes. These students are given a day or a range of days and an appointment ticket to come in to change their program. Most of them come to change their programs. Those who do not appear have their advisement data sheets reviewed by the Dean of Academic Affairs and staff. Schedules for students who come in are approved. Occasionally schedules of those who did not appear are also approved because of something found on their transcript by the Dean of Academic Affairs. Otherwise the class for which they did not have the prerequisite is dropped and the student is sent a new schedule.

Summary

This system installed at Borough of Manhattan Community College has advantages and disadvantages.

Highlights of the System

- Academic Checking
- Scheduling. Scheduling of both open, nonconflicting sessions and exclusion of days and times when a schedule can be worked out for a student
- Departmental Data Entry. The departmental entry whereby many of the students can complete registration in their own departments is a great convenience for students.
- Ongoing Add/Drop. An ongoing add/drop option is an advantage to the student, but a large disadvantage for the Registrar and the staff of the Registrar's Office which may handle over 16,000 program changes.
- Staff Resources Saved. Staff can register students for two semesters (usually the summer or fall) at the same time.
- Student Communication. Students can be notified by letter when they have failed a prerequisite and must, therefore, come in to change their program.

Disadvantages of the System

- The system is very labor intensive. BMCC spends approximately $85,000 a year on temporary help for data entry. That figure excludes personnel in departments and in the Registrar's Office. BMCC had decided, however, that this expenditure is justified to keep students registered in the classes for which they are academically prepared, and thus, to retain them as students of Borough of Manhattan Community College.
- The number of days set aside for registration (approximately 30 days a semester) is very disruptive to the staff of the Registrar's Office, as well as the Dean of Academic Affairs Office.
- The Dean of Academic Affairs or a designee must be present to solve problems at all times.

Advantages of the System

- BMCC now has students properly placed in the correct courses.
- The system allows the machine to do the scheduling for the students. Any problem is

Sample Document

BOROUGH OF MANHATTAN COMMUNITY COLLEGE
THE CITY UNIVERSITY OF NEW YORK
199 Chambers Street
New York, NY 10007

01/09/92

[redacted] JANNIE C SS: [redacted]
185 PARK HILL AV/5S
STATEN ISLAND NY 10304

Dear Student:

Examination of your transcript shows that you did not successfully complete one or more of your courses during the FALL 1991 Semester.

Because you did not Pass:	You May not take:
ROG-062 142	ENG-101 711
	HUM-101 511

THEREFORE YOU MUST CHANGE YOUR PROGRAM. We have scheduled a special change of program for you. Enclosed you will find a ticket to this change of Program. If you can not come at the time indicated on the ticket, you may come at a later time that day up until 7 pm.

If you do not change your program by JAN 23, 1992 , we will cancel your registration for these effected courses.

This cancellation may have an affect on your bill as well as your financial aid. I strongly urge you to change your program by your appointed time but no later than JAN 23, 1992 .

You must bring:

1. This Letter & ticket
2. Your Advisement Data Sheet
3. Your Registration Confirmation
4. Your Transcript
5. Placement Test Results

Very Truly Yours,

Gregory J. Wist
Senior Registrar

REMINDER:
=========

1. Your Bill must be settled by JANUARY 23, 1992 .
2. Classes begin on FEBRUARY 10, 1992 .

resolved with the student on the spot.

- The student receives a lot of personal service and student stress is reduced.
- The student receives an immediate schedule and bill.

The key to this whole system is a loyal, well-trained data entry staff. BMCC has obviously been very pleased with the system and continues to make minor changes as necessary.

Snow College

Helping Students Through the Maze: the Advancement System

Snow College is a small, publicly owned community college located in rural Utah. The fall 1992 enrollment was just over 2,800 students generating a fulltime enrollment of 2,452. Of this number, 2,110 attended classes on campus and the remainder enrolled at off-campus locations, including high school concurrent enrollment.

It has long been the goal of Snow College faculty and staff to provide an environment of caring and helping. The advancement program is seen as a key factor in supporting such an environment and increasing student retention.

The ideal advisement plan is to have a corps of professional advisors help students realize their college goals. In the absence of adequate funding, Snow College has decided to use what is commonly referred to as a "Split Advisement Model." We split the advisement responsibilities between faculty and two professional counselors/advisors, with the bulk of the students being advised by members of the faculty. In reality, this often ends up being an "Advisement by Thirds" program:

- 1/3 of the faculty do an excellent job.
- 1/3 can be motivated and provide an acceptable service.
- 1/3 are not helpful to the students, and often create problems for both the students and Registrars Office.

Students are assigned an advisor based on what they indicate as their major on their application for admission. Undecided students are assigned to the advisement council and faculty advisors. As students change their major, they are reassigned to an appropriate advisor.

The college is very cognizant of the fact that the quality of advisement support is being compromised. The current plan, is to phase in a team of paraprofessional advisors assigned to the five academic divisions, who will specialize in working with students and their respective majors, and be responsible for students' progress towards graduation. This will take place over two to three years.

The Past

In the past there was no online computer help for advisors. Full class lists were printed daily and distributed to advisors. Students were advised during registration week in their advisor's office. The class request card, signed by the advisor, was then taken to the Registrar's Office where the registration was completed.

Recurring problems with this system included:

- Classes were full by the time students reached the Registrar's Office. Those doing the entry work were not able to help students find replacement classes so students were sent back to the advisor's office, often at the other end of the campus.
- Holds from the Financial Aid Office, library, etc. were only discovered when the students arrived at the registration window.
- Lines were long and slow moving. Students missed classes to stand in line.
- The frustration level of students and advisors was high.

Help From Title III

In the summer of 1988, Snow College was awarded a Title III Grant for $600,000 over a three-year period, primarily to be used to improve advisement. With part of this money, PCs were purchased for faculty advisors. This, along with a networking system (see later discussion), placed advisors within reach of the Student Information System (SIS) Databank.

After the installation of this equipment and extensive training of faculty advisors, each advisor was given on-line access for advancement and registration.

Advantages of the New System

The advisor can now sit down with the student, complete the advisement session, enter the schedule into the system, and let the student know that his/her name is on the class role. Closed classes are identified on the spot, and a new selection can be made. The student leaves the advisor's office with the registration process completed.

Holds on the student's record can be identified by the advisor, and calls can be made from his/her office to help students clear up the problem.

Huge lines at the Registrar's Office window have been greatly reduced.

With accurate, current information available to the advisors through the SIS system, the quality of advisement has been improved. (See appendix for additional details.)

At Snow, and nationally, students want their advisors to be:

- Accessible
- Accurate and have specific information pertinent to their academic progress
- Caring and concerned about their individual needs

Snow College's new system of online advisement and registration has moved it closer to being able to meet these expectations.

Getting Them on the Class Roll: Registration

As has been explained in the advancement portion of this report, the former system of advancement and registration presented a series of problems, primarily for the students. Notwithstanding some reluctance on the part of the registrar, the college decided to decentralize the registration process on campus. Through a federal grant, it was able to purchase the hardware and software to make such a decentralization process possible. The service to the students improved significantly, and essentially each problem identified earlier was eliminated.

Snow is currently in the process of placing terminals at some of the off-campus instruction sites to improve services to students who are anywhere from 50-100 miles from campus. The first site will be the Central Utah Correctional Facility where approximately 80 inmates are enrolled in Snow College courses on a year-round basis.

New Problems for Old Ones

In order for the Registrar's Office to control access to the system, a process of application and training had to be put in place. Applicants are now asked to complete parts of a Request to Access Student Records and return it at an appointed time to the Registrar's Office. At the appointed time, the registrar's staff provides a training session for up to five people at a time. In the training session, each participant receives a seven-page instruction guide which is reviewed paragraph by paragraph and demonstrated on the terminal. System security and confidentiality of information are stressed. The consequence of violating the training agreement is discontinuance of access.

Once the advisor is adequately trained, the trainer and the registrar sign off on the application. The original copy of the application remains with the registrar, one goes to the applicant, and the third to the computer director. The applicant then registers a confidential password and is further instructed on log-in procedures. Refresher training is also provided prior to each registration period.

Limitations are imposed on advisors. System access for actually entering registrations is limited to the first week of the registration period when the student demand is the greatest. Other screens providing advisement information, as shown in the appendix, are only available to the advisor for display. It is a truism that whenever one problem is solved, another one appears on the scene. From the registrar's perspective, the following problems and time

demands have to be addressed:

1. Some advisors simply do not follow the instructions given to them in training. Depending on the seriousness of the neglect, the advisor is either given a warning or immediately disallowed access.
2. The advisor who allows a student assistant access to the system loses access.
3. Advisors are asked to return the original of the hard copy registration form to the registrar within 24 hours, showing the advisor's initial and date of entering classes. Some of the advisors turn in partially completed forms or do not turn them in at all.
4. A few instances have occurred where students, though registered, never appeared on the class roll. This happens if the advisor is not careful to make sure every necessary step has been followed in entering the classes.

The registrar has concluded that this system is of significant value to the student. For it to become more effective and efficient, the program needs refinement, particularly in selectively allowing access to the system and giving registration privileges.

The Work Behind the Scenes: Computer Support

Using the Student Information System (SIS)

Over the past three years the number of people who have access to the system and the methods of access have changed dramatically. In 1989 there were only two data entry people in the registrar's office who registered students. Presently, Snow College still has only two data entry people, although more than 130 people have access to the system and about 80 faculty and staff have authorization to register students.

Dumb terminals were the only equipment used to access the administrative computer. At present, Snow has a fiber-optic network installed on campus connecting most of the buildings. Employees access the system either by direct access (terminal server), data phones (Rolm), or the network. The type of access is dependent on what has been used previously, or on the location of the office. Offices with dumb terminals that still work will probably continue to use them. When replacement is necessary, the terminals will be replaced by PCs and access will be shifted to the network. Data phones are used in locations where the network is not installed. During the summer months, remote registration via modems is done from large metropolitan areas.

Turning on Registration for the "Masses"

Snow College is on a quarter system with four quarters during the year. Summer and fall quarter registrations are handled by the Registrar's Office due to the low enrollment for summer and the long registration time allowed for fall registration. At the beginning of the winter and spring quarters, faculty advisors and selected support staff aid in the registration process due to the short period of time allotted to complete the job.

Before registration begins, Computer Services obtains an updated list of advisors from the

Advisement Center, and a list of support staff authorized to register from the Registrar's Office. The names of people who have changed jobs, or who no longer advise are deleted.

Because those who handle registration need a set of online screens to register and advise, Snow College has set up a template of a reference screen that defines the group of screens needed. Advisors are tied to that template when they log in. Registration by the masses is only allowed for one week in the registration cycle. When registration actually begins, only one screen is changed to allow students to register. This same process is used to disallow registration.

Problems

In implementing and operating this registration environment, the Computer Center staff has had and is experiencing a number of different problems. With an already insufficient staff, the opening of registration poses a problem since a major portion of staff time is dedicated to making the process work, particularly on the first day, in addition to servicing all the other administrative computing needs.

Because advisors use the registration system infrequently, the first day always brings a flood of questions and problems. Advisors are always encouraged to work the system several days prior to registration and have problems resolved before students line up. But, faculty, like students, tend to procrastinate. It is difficult to respond to 30 or more inquiries at the zero hour of registration. The most common cries are, "I forgot my password." "What is my operator number?" "Why doesn't this work?" and "What is the function command to register?"

During the peak period of registration the number of users on the administrative computer poses another problem. Between 20 and 30 users will be logged on the system at any one time and the peak periods may increase to over 60 users. The response time will slow to over a minute. Consequently the number of users has had to be limited to 50, and other offices not involved in registration have had to be encouraged to log off the computer during the peak periods of registration. Snow College is considering adding another 32 megs of memory to the administrative computer to handle the peak periods.

Once the users get on the computer, whether they are using it or not, they do not want to log off. Snow College has a log-out procedure that checks to see if a person has been idle (no key strokes) for twenty minutes. If that is the case, that person is automatically logged off the system. The auditors like the procedure for security reasons. Some users are not happy about it but it does help handle the user demand.

Summary

Involving many people in the registration process does increase the demands and pressures on the Computer Center. Snow College is committed to continuing this process. Several good things are happening because of increased involvement:

1. The students are getting better advisement.
2. Time is saved because other students can be advised and registered without going to several different offices.
3. The computer system is being used more efficiently.
4. Faculty and staff are more knowledgeable about the information that is available, and the information is becoming more accurate.

Progress is being made in providing better service to students.

APPENDIX

REQUEST TO ACCESS STUDENT RECORDS

NAME:_____ SS#_____

DEPT:_____ OFFICE LOCATION:_____
Bldg./Room

Please state the specific need(s) you have to access the Snow College Student Record System:

- ☐ Student Advisement
- ☐ Financial Aid
- ☐ Other-please explain:_____
- ☐ Student Registration
- ☐ Enrollment Cerification/ Eligibility
- ☐ Housing Information

I have participated in a training session which explained the student record system. I understand that student data is confidential and is not to be released to another party without the written consent of the student, and then only through the Registrar's Office. I understand that access is limited only to the undersigned and does not extend to other parties, including student assistants. I agree to use the system, including the registration of students (if applicable), according to the guidelines provided in the training session.

_____ Date

_____ Signature

_____ Training Session Date

_____ Trainer Signature

Approved: _____ Registrar's Signature

_____ Date

(Requestor - If you have questions regarding the log-in procedure and the password, please contact Computer Services.)

Computer Center notified:_____ Date

Distribution: Original-Registrar's Office., Yellow-Computer Center, Pink-Requestor

Women at the Top
Administration from a Woman's Point of View

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Higher education has a long way to go before it can claim that the makeup of the administration is comparable to that of the student body, genderwise. The number of women in higher education administration has, however, increased since 1975, according to the American Council on Education in *Higher Education and National Affairs*. The number of women CEOs of colleges and universities in the United States went from 148 in 1975 to 348 in 1992. In 1992 there were 184 women CEOs of private schools and 164 in public schools. Although the numbers are higher for private schools, the percentage growth is much higher for public schools. In 1975 there were 132 women CEOs in private schools and only 16 in public schools. Of the 140 CEOs named in 1992, 39 are women. In 1992 there were 154 women CEOs in private four-year schools and only 30 in private two-year schools. On the other hand, there were 58 women CEOs in public four-year schools and 106 in public two-year schools. As of 1992, there were only 50 minority women CEOs; most of them (26) are African American. Unofficially, the total number of women CEOs for 1993 is reported at 380. This is a preliminary number, however, and is not confirmed.

After conducting various surveys, the authors find that women can take the following strategies to climb the administrative ladder:

- Pursue further education—most doors will be closed at the higher levels without a doctorate.
- Find a mentor—having both a male and female mentor is important to get different perspectives and insights.
- Work longer hours—working an average of over 40 hours a week is necessary to being promoted.
- Evidence mobility—this is found to be important for the advancement of community college administrators, but many women are not mobile for many reasons. Even though advancement within one's school is possible, it is usually not as rapid as when one is mobile.
- Garner organizational support—if you do not have this you will probably not advance and should move on to another institution.
- Take risks—nothing ventured, nothing gained.
- Be optimistic—it spreads to others and you can get a "can-do" reputation.

- Demonstrate people skills—these are crucial in dealing not only with those above you but also those you supervise.
- Exhibit the ability to see many options, possibilities, and opportunities.
- Be the problem solver—this is a good reputation to earn.
- Participate in a leadership program—you can meet people who can help you learn new skills and heighten your motivation level.
- Publish and present at conferences.
- Pick your fights carefully.

The following factors, also taken from surveys conducted by the authors, are barriers for women seeking administrative positions:

- The male-dominated academic world—it does not always take females seriously.
- Sexism, racism, regionalism, favoritism—the "old boys" network.
- Glass ceilings.
- Expectations of being a "super woman."
- Pressure of having to represent your gender and/or your race.
- Sexual harassment.
- Salary ranges that are generally lower for women.
- Not being able to move.
- Role conflict.

In addition to the many barriers women must face on their way up the administrative ladder, they must also deal with the varied perceptions others may have of them. In many instances, perceptions determine the leadership or management styles of women administrators.

According to research reported by Sherry Cohen (1989), women entered management or high administrative ranks in notable numbers in the 1970s. Establishing credibility necessitated changes.

- Women left behind feminine conditioning and adopted the language, management style, and the dress of their colleagues and supervisors—men.
- Women gave up dresses in favor of "dress for success" suits.
- They discovered that men used exclusive vocabulary to communicate in the workplace—much of it military and sports jargon. Women followed suit. Observing that their style of making requests by saying "please" and "thank you" was mistaken for weakness, they adopted abrupt and "macho" behaviors.
- Women assumed a quasi-military model of management where the boss makes the decisions (pp. 77-79).

This traditional management style is known by several terms (Rosener 1990, pp. 119-20):

- Directive Management/Leadership—one-way communication where the boss gives directives or orders.
- Military Management Model—leading from the top.
- Transactional Leadership—job performances viewed as a series of transactions; more

concern shown for the task than for people.

- Command and Control Style—no input from employees; closely monitored performance.

There is a new breed of women administrators and managers who recognize that they can do a better job if they use a leadership style that parallels their personal style or traditional upbringing (Cohen 1989, pp. 77-79). Women now realize that such traits as nurturing, encouragement, and empathy have value in the workplace. These so-called "feminine traits" prompted a new management/leadership style, known by the following terms (Rosener 1990, pp. 119-20; Kazemek 1991, p. 16; Powell 1990, pp. 68-75):

- Feminine Management Style—first used by women and now adopted by men.
- Supportive Management Style—two-way communication between boss and employee; encouragement, praise, and support are given.
- Transactional Leadership Style—the transforming of the interest of the individual into the interest of the organization. Four characteristics are prevalent: encouraged participation, shared power, enhancement of people's self-worth, and empowerment, emphasized in Roueche, Baker, and Rose's *Shared Vision* (1989).
- Participatory or Interactive Management Style—involvement of as many as possible in decision-making.
- Collaborative Management Style—interaction or team approach that culminates in a consensus.
- Spider Web Management Style—leader in center of circle to get a feeling of being in the "middle of things," not at the top; emphasized in Helgesen's *The Female Advantage* (1990).

Thus, this new management/leadership style can be best characterized as cooperative, a team approach, intuitive, and people- and task-oriented. Though the feminine leadership model allows input and decisions by all, it is not without disadvantages:

- It takes a considerable amount of time to administer.
- It gives up control by the boss.
- It opens doors to some criticism; the boss may be perceived as not having the answers.
- It may expose personal and turf conflicts.

Thus, an androgynous model may be the model used most often in the 90s. The androgynous model is characterized by both feminine and masculine (traditional) styles. This model combines task/people and assertiveness/cooperativeness (Powell 1989, pp. 10-13). Nevertheless, the influx of women administrators/managers will influence organizations, as the number of white males will comprise only 15% of new entrants into the workforce from now to 2000, and will make up only 39% in 2000, down from 46% today (Abbasi 1991, pp. 24-32).

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Guerilla Guide to Computing: Developing a User-Oriented System in a Small School

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"The computer is in some ways a grand machine in the Western mechanical-dynamic tradition and in others ways a tool-in-hand from the ancient craft tradition. The best way to encourage the humane use of computers is to emphasize, where possible, the second heritage over the first, the tool over the machine."

Introduction

Computers have fascinated me since my first introduction to them in 1980. But people are more important to me than computers, and, ever since computers and I were first introduced, I have looked for ways to put this amazing contraption to work to help people get things done.

From 1985 to 1990, I was involved in putting computers to work for the staff, faculty, and students of Antioch University Seattle. When I began there were four computers in use, two each in administration and the academic computer lab, and a general attitude of hostility toward the "Big Brother" mystique of computers. When I left there were 19 Macintoshes (My experience has left me with a strong bias toward the Macintosh and a "graphical user interface." [See discussion under "User Friendliness."] The points in this paper, however, are not specific to any one computer.) on an administrative network and five in the computer lab. But more importantly, the computers were being *used.* Computer lab time was often booked up. The administrative computers were heavily utilized by the 50–60 administrative users. And computer-assisted projects abounded, from relatively simple ones like a database of graduates and a spreadsheet/word processor Financial Aid award letter, to very complex ones like an Admissions tracking system and student information system. And the trend continues to this day.

This paper describes the factors that made the introduction of computers to this small school successful. (When I began there were four computers in use to serve 300 students in one undergraduate and three graduate programs. There are now more than 500 students, a fourth graduate program, and a teacher-certification program.) These same factors apply to the process of significantly upgrading an existing computer system. The approach that the people working with me and I took was intensely people-oriented. We were guided by a set of principles which begin this paper. I found that the process occurred in identifiable stages of development. I also found that trying to do something inappropriate to the current developmental stage did not work. The stages (and some examples of my experience with each) are briefly described. Finally, assuming that a primary interest of a Registrar or Admissions Officer is to develop a comprehensive data management system, I've discussed a "homegrown" *versus* an "off-the-shelf" solution.

Guiding Principles

A set of principles can provide direction in the midst of conflicting demands and unexpected developments. Below is a list of the major principles involved in a successful introduction of computers to an organization, followed by a discussion of each.

The guiding principles are:

- Creating a Preferred "Computer Culture"
- Computers as a Tool
- User-Oriented Design
- Needs Assessment
- Self-Reliance
- User Friendliness
- Peer Support
- Training

Creating a Preferred "Computer Culture"

The introduction of computers is a cultural shift in the life of an organization, and close attention should be given to managing that new culture. A preferred culture is one that is supportive, unintimidating, responsive to users' legitimate needs, and even empowering as users take up this unique tool and begin doing their work differently because of it. Conversely, inattention to cultural context often exacerbates users' fears and their tendency to feel "dumb" or powerless. ("The computer has power and you don't!"(Roszak 1987; citing a popular myth.)) The result is unnecessary resistance—and even hostility—that translates into underutilization and lost opportunity.

The experience of users, and therefore the overall effectiveness of the computer system, is profoundly affected by the values and attitudes of the people designing and supporting the system. Taken together, these values and attitudes form the basis for a "computer culture," the overall context of the users' experience of computers in your organization.

Creating a preferred computer culture requires thinking about the experience users should have with the new computers. How do you want them to be treated? How should the computers be approached and used? These kinds of questions should be talked through with others and the most important values and attitudes recorded. Then *all planning and actions should be based on what has been written down.* For example, the element of play was included in all aspects of the early installations and training at Antioch, with the introduction of computers presented as an adventure. The Second Rule of Computing was emphasized: "You must make mistakes in order to learn." (O course, the First Rule of Computing is, "If you can't afford to lose it, make a backup copy.") People were encouraged to try new things. A new management policy was proposed supporting at least one hour a week (10–15 minutes a day) for "play time"—time when users could try out new software or learn how to do new functions. The element of play was reflected in the developing culture and persists to this day.

The process of culture-building requires constant monitoring. At Antioch the *Computing Advisory Group*, or CAG, was formed, drawing together a few key people from various levels of the organization who had a common interest in computers plus an ability to see the overall picture and grasp the dynamic forces at play. CAG became involved during the earliest stages of planning and design. The group talked at length about the prevailing culture at Antioch and the potential impact the leap into a full-blown administrative computing system could have. CAG discussed various strategies for introducing new equipment, training users, addressing fears and anxieties, determining needs, etc.

This group was a sounding board, a place where the consultant could get some perspective on the overall picture and the potential impact on users. This was especially important when the consultant was mired in detail and eager to "make it happen" by imposing solutions. The group met as needed, usually every two to three weeks at first and less often as strategies began to unfold. The level of user satisfaction and acceptance would have been very different without the input of this group of interested users.

Computers as a Tool

Computers in and of themselves are little more interesting than a telephone, nor more useful. Rather than being viewed as a "grand machine" in the Western tradition of fascination with technology (witness Da Vinci's passion for the art of the machine), the computer is relegated to its proper place when viewed in the more ancient context as simply a tool for doing work (Bolter 1984, p. 232.) The value of the *work* determines the value of using a computer to support it—and then only if the computer is, in fact, a tool *appropriate* to the work. (For example, for most people using a computer to store recipes is like using a flame thrower to light a candle.)

Many people, if not most, experience some intimidation when they first approach a computer or are presented with a new computer application. Somehow they've gotten the idea that computers are more powerful than they are. The "computational model of mind" (Roszak 1987) that has permeated the culture would even lead people to believe that computers are *smarter* than they are. In fact, the computer is only a tool—a complex and sophisticated one to be sure, but a tool, nonetheless. And the tool is only useful when it is put to work. An essential value of the preferred computer culture is that the computer is not an end in itself. Installing computers should not be done for its own sake because it's "neat" or "modern" or "everybody else is doing it." The computers must serve a purpose. And that purpose is to help people work with less effort. (Note: If you want to add "more efficiently" or "more productively" or even "faster," that's fine. But the same amount of work should also be able to be done with less effort, i.e., it should be easier.) The clearer idea people have about what overall *purpose* computers serve in the organization, the more effective their introduction will be.

User-Oriented Design

An information system built around users is the most successful and productive. *The users of a computing system determine its success or failure.* The introduction of computers into an organization (or the expansion of an existing computing system) should enhance the

organization's performance or meet some similarly significant management goal. But whether that goal is reached depends upon how (and whether) the computers are used:

- How much are the computers actually turned on and in use?
- What kinds of tasks are being undertaken?
- Are the computers doing tasks that could be done better manually?
- Is the computer a "super-duper calculator" or a "gee-whiz typewriter," or is its capacity as a completely different tool being utilized?
- Has the way of doing business changed, or has the computer simply been added on to it?

Management has an important responsibility for the design of a computer system, particularly regarding the latter two questions above. But the users are at least equally important. *No matter how well-designed (or well-intentioned) a computer system may be, it is the users who will determine how (and how well) it is used.*

A steering committee involving upper management, users, and computer people makes an ideal team for planning and monitoring the implementation process. Users should be involved from the beginning in the design, testing, training, installation, and application of the computer system. Users who feel a sense of "ownership" of the system are much less likely to resist it, be intimidated by it, work around it, or outright refuse to use it. In fact, feedback from users should be the primary tool for planning and managing the system.

A group like the Computer Advisory Group (see above) should monitor this feedback and translate it into more effective planning and implementation strategies. Users should have a forum (like the Computer Kahunas below) to present and discuss concerns and ideas. The more users are involved in decision-making, the more successful that decision-making will be.

Needs Assessment

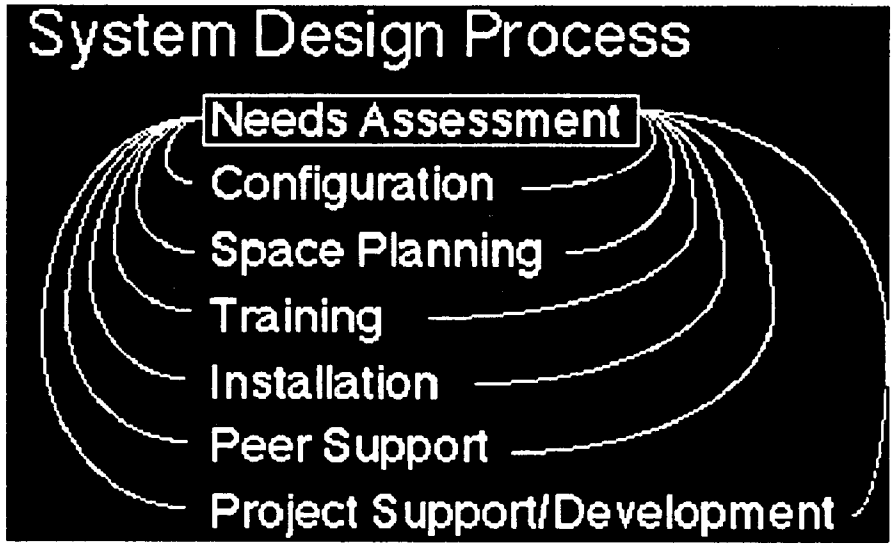
Needs assessment is essentially asking the question, "What's the problem or issue as *you* see it?" Needs assessment should be the first step before *every* action taken, from planning to troubleshooting. It is critical to creating a user-oriented computing system. This approach is counter intuitive to those who find themselves under pressure to produce solutions as quickly as possible. But, in fact, the "solutions" devised are in real danger of being incomplete or even addressing the wrong issues without the input of the people who will implement them. As pointed out in a trainer's guide for adult learning, "It is easy to lose sight of the fact that it is *more efficient* to spend the time required to 'find the question' before we seek an answer, and to thoroughly explore and 'define the problem' before deciding on a solution" (Ingalls 1973).

Needs assessment is the first step in any activity intended to involve participants in "owning" the outcome. It is a critical aspect of the cultural management described above because it establishes a context in which users' contributions are honored. Over time, this context makes needs assessment easier as users learn how to provide information that is useful to a solution.

"I need a database" doesn't say much about what the user actually needs; over time users can become more sophisticated at defining the needs they want to address and therefore more

effective *participants* in designing solutions. Similarly, "My computer doesn't work" doesn't say much about the problem. Over time, users can learn to be explicit about exactly what they were doing when the problem occurred and what other factors might have influenced the situation.

When needs assessment is built into *every* action taken by computing staff, it becomes a powerful influence towards the successful outcome of those actions. It is especially important in the planning and implementation of each phase of a computer introduction: configuration design, space planning, training, installation, peer support (see below), and project support.



Self-Reliance

"Self-directed learning" has become a buzz word, but there are few arenas where it is more applicable than in computer use. Unfortunately, self-directed learning all too often means struggling to get through a project all alone with only an incomprehensible manual for help. This kind of experience does *not* build self-reliance and the self-confidence on which it is based. What *does* build self-reliance are four key factors:

- Paying attention to users' concerns and needs
- Providing accessible training in the basics
- Providing resources for problem solving (manuals, peer support, help desk, etc.)
- Teaching users how to *use* the resources available (i.e., teaching problem-solving skills)

If users' concerns and needs are addressed, their confidence level increases. If they are given an adequate introduction to the basics, they are not set up for initial failure and frustration. And if they are provided useful resources and some help with how to use them, most users will be able to survive with little or no intervention, and many users' learning will be dramatic and lead to delightful discoveries.

The key issue is building users' confidence. The higher the users' initial confidence level, the fewer demands will be made on computer support staff during the critical first phases of installation and the less "down time" users will experience waiting for help to arrive.

User Friendliness

An approachable, easy-to-use computer is a computer that *is* used. And the same goes for an approachable, "easy-to-use" computer support staff. Users who find computers to be approachable will use them more than users who do not. This principle should permeate the computing culture so that every interaction between users and their machines—as well as between users and the computer support staff—will be as unintimidating and supportive as possible. Both the computer and the staff should encourage users' interest and support their sense of adventure.

Choosing the right computer system (the proper tool) can make all the difference in creating the preferred computer culture. The ideal computer provides a consistent, easy-to-understand interface. It allows effective use with only basic skills. And it makes it possible for a user to build on those basic skills to become proficient with more sophisticated applications.

Experience with a graphical user interface (i.e., an icon-driven, point-and-click, menu-based means of interacting with the computer) has suggested that the additional initial investment in equipment more than pays off in reduced training time, user satisfaction, and user sophistication (i.e., users' ability to use a wider range of applications). Some applaud the Apple Macintosh because of its consistency and ease of use (and ease of support). However, windows-based applications and other graphical user interfaces like the NeXT computer or HP's "New Wave" interface can also work well.

Peer Support

It is not possible for a support staff, no matter how large, to respond to all the needs of users. Actively encouraging a network of users with higher levels of expertise who may be able to answer the more immediate questions of their peers will greatly reduce dependence on the computer support staff for assistance. In return, these Super Users should receive special attention from the computer support staff, including additional training and priority access to help.

Many computer people tend toward megalomania; they want to do it all. Fortunately, it is not possible to be everywhere meeting everybody's needs for support. And fortunately, too, people tend to learn better what they learn themselves to learn. They also tend to learn better about computer stuff from their peers than from experts. (See further discussion and examples under "Stage 3:Basic Tools Training and Application"below.)

These facts suggest a system of computer support that relies on key users in each work area. Antioch called these key users Computer Kahunas. (Kahunas are South Pacific Island chieftains.)

Training

There is no substitute for high quality, well designed training. Whether in classes, individual tutoring, short seminars on specific subjects, or user group presentations, the better the training, the more effective (and productive) the user. Some factors that lead to successful learning experiences include:

- Organizing training around perceived needs, i.e., applying a specific new skill to an existing problem (for example, learning to use tables in word processing to produce charts)
- Hands-on training that allows participants to experiment with what they are learning and apply it to their own needs
- Applying adult learning principles to training that respects individual learning styles and involves the learner in the training design
- Limiting training sessions to four hours maximum to allow participants to integrate new learning and to reduce "overwhelm"

The most important factor, however, is allowing time for ongoing learning or "play time." Users should be given *at least* 10–15 minutes a day to practice what they've learned or to learn new skills. *Management that refuses to reduce workloads enough to allow for training time is cobbling the potential productivity of the system and wasting a portion of the investment in it.*

Developmental Stages

Like any living entity or dynamic system, an emerging computer system goes through various stages of development. Recognizing and honoring the current stage of development is essential to designing and implementing effective strategies for computerization.

The stages identified during the process of introducing computers to Antioch were:

- Preinstallation Planning and Training
- Installation and Initial Training
- Basic Tools Training and Application
- Network Implementation and Training
- Project Development and Support
- Data Management
- Information Management

Perhaps the most seductive trap for inexperienced computer users is the expectation that, once the computers arrive, a fully functioning computer system is right behind. Several factors are at work here, including:

- The mystique about computers gives the impression *computers* solve problems, when, in fact, *people* do (e.g., "My office is a real mess; I need a computer!").
- Once users get over their intimidation, they tend to see the computer as capable of anything (e.g., "Why can't I just push a button and make the computer do it?").

- Computers tend to warp one's sense of time: users become increasingly impatient with the few seconds the computer takes to save a document, recalculate a spreadsheet, or retrieve their electronic mail. This time warp also bleeds into all things associated with computers (e.g., "I want a solution and I want it *now!*").
- Investing in computers costs a lot of money; management tends to want to see some results from their investment, preferably immediately (e.g., "We have all this equipment, but what is it doing for us?").

Computers are an extraordinary tool, but, like any tool, the proper and most effective use of them needs to be learned before they become of real use.

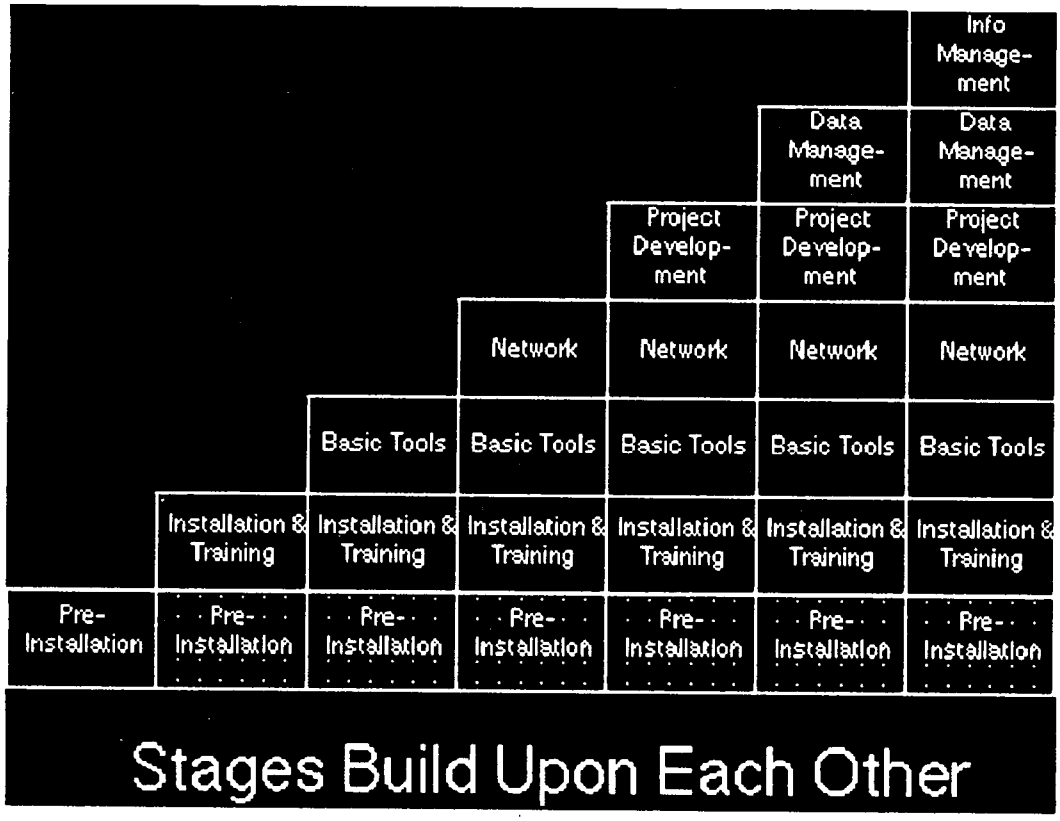
The stages below describe Antioch's experience with introducing a computer system virtually from scratch. Antioch discovered *there is a dynamic interaction among users' experiences and expectations, strategies for design and implementation, and the current stage of development.* When it tried a strategy that addressed a stage of development beyond where the system actually was, it was not long before users' frustration and dissatisfaction became apparent. Antioch perceived a similar response from users when it did not anticipate the shift to the next developmental stage with new strategies to address the next level of issues. It concluded that *computing strategies succeed only when they are appropriate to the current stage of development.*

Each stage builds upon the successes—and failures—of the previous stage. This principle is especially true of the earlier stages. The approach at Antioch reflected its intention to build a knowledge base within the entire administrative structure of the organization upon which the later stages of development could build. Initial training and individual tutoring was, therefore, focused on the knowledge level of the *organization,* with the intention of bringing everyone to a base level of skill and, over time, incrementing that skill level across the entire staff.

There is a sort of multiplier effect that begins to take hold in later developmental stages. The activities associated with each stage, once introduced, do not go away.10 At the same time each *new* stage introduces a new level of complexity. For example, the basic skills stage involves training and support for word processing, databases, and spreadsheets. Work at that level continues as new stages are introduced, and as new people come into the organization who need to be brought up to that stage. Consequently, additional support resources—mostly time and enhanced skills for the computer staff and peer support network—are required as each new stage is introduced, just to maintain a consistent level of ability to respond to users' needs.

This "multiplier effect" has implications for computer support staffing. In a smaller organization, it is possible for the process of computerization to begin with one energetic person who works half-time. But the process will soon require additional time and people, and those personnel needs should be taken into account from the beginning.

By the same token, the building momentum of computerization can seduce an organization into *over*staffing. Antioch started with one half-time person (the consultant), peaked at 3.5 FTE, and now operates well with less than 2.0 FTE.



Users add complications themselves with each new stage. There is a dance of expectations and realities—similar to what Franz Fanon called a "crisis of rising expectations" in reference to developing countries. Once users get through the basics, begin applying the computer to their own work, and see a functioning computer system in place, what they think is possible begins to rise exponentially with each new stage. Responding to those expectations with realistic appraisals of what actually *is* possible (given the available resources and the current stage of development) is a major challenge.

Perhaps the most useful response to this "crisis" is a clearly presented plan of action or timeline indicating (in approximate terms) when each action is likely to occur. Users at Antioch seemed more willing to wait for the next development when they had a sense that their time would come and approximately when that time would be.

Stage 1: PreInstallation Planning and Training

A whole host of activities occurs during this stage, which is by far the longest of the early stages. Activities include:

- Developing support for the concept of a computer system (new or upgraded)
- Obtaining organizational approval for purchasing a computer system
- Convening a design team of computer professionals and users
- Doing a systems analysis and design process with the design team, keeping in mind the user-oriented focus, resource constraints, and long term goals
- Making the purchasing decisions for hardware and software in consultation with users
- Preparing an installation plan that determines which computer goes where and the order in which each computer will be installed
- Preparing a space plan that accounts for locations, wiring, power, etc.
- Developing a training program to introduce users to the basic concepts and language of computing ("computer literacy")

The PreInstallation Planning and Training stage is absolutely crucial to the success of the entire project. The choice of the design team is particularly important. Politically it must have respect and influence in the organization without being seen by end-users as enforcing a "top-down" solution and without being seen by management as a threat. Even more difficult, this group must be sensitive to the organizational culture and be able to scan for clues about users' attitudes and likely responses to actions taken.

Stage 2: Installation and Initial Training

An implementation plan that spreads the installation process out over time to make it more manageable for the computer support staff will also make it a more effective experience for users. By installing the computers for one workgroup at a time, training can be designed to meet each group's specific needs.

At Antioch the installation process occurred over four-plus months. A Mac was installed in each administrative area of the organization (Admissions, Registrar, the four degree programs, etc.), one area at a time. The installations were spaced three to four weeks apart so meager support personnel (by then 2.0 FTE) could focus on each new group of users. Having learned a lesson the hard way, all of the Macs were kept in their original boxes in a locked room until they were installed according to our plan.

A timeline was published indicating when each area would receive its computer. The order of installation was discussed with the community. and the process to be followed with each installation. Users were understanding about their placement on the timeline, but as their appointed date approached their eagerness would noticeably increase.

Each installation was accompanied by a process of needs assessment, training, installation, further needs assessment, and further training, as follows:

Needs Assessment I measured the computer literacy and skill level of the users in each area about computers in general and the Macintosh in particular.

Initial Training introduced the basics of Macintosh use. All users were required to take the "Guided Tour" (now "Macintosh Basics"), a self-paced, animated guide to the essential features of the Mac such as pull-down menus, windows, icons, file management, etc. All users were also trained in the basics of printing in our networked environment.

Installation At this point the computer workstation was installed. (The "workstation" consisted of a computer-height table (some with casters), a carrel shelf for storing manuals, the computer itself (in most cases a 20 megabyte Mac SE), and a mousepad. A rolling, pneumatically height-adjustable chair came with the workstation. Finally, a disk box (including a Guided Tour and a couple of backup floppies) and a cermonial screen-cleaning cloth completed the station). Users were encouraged to play with the drawing (SuperPaint) and word processing (Word) applications.

Needs Assessment II focused on the work being done in each work area to determine how the computer could make a contribution to easing the workload (over time! Using the computer to do the same work takes more time at first). A workplan was developed for each area, involving the computerization of some task for which they were responsible using basic computer tools (i.e., word processing, spreadsheets, and databases). The goal was to enable users to apply the computer tool to their own work in an approachable way.

More Training (See the Basic Tools Training and Application stage below.)

Stage 3: Basic Tools Training and Application

The "basic tools" of computer use are word processing, spreadsheets, and databases. In many cases, these are all the computer tools a user will need.

The problem of introducing a large number of novice users to a powerful computer environment would have been staggering without the Macintosh's ease-of-use and the design of its approachable and consistent user interface. The adult learning principle of self-directed learning was strongly encouraged during this stage. The computing staff tried to cast its role as support for the training that users were providing *to themselves.* Fortunately, most Macintosh manuals include well-conceived tutorials, and many users were able to begin their exploration of the Macintosh applications using this resource.

The Initial Training for the Mac described in the previous stage was supported in two ways:

Individual Tutoring (with users who had taken the "Guided Tour" and learned the basics of printing) focused on the users in work areas where the computer had been installed or was just about to be. With as many as possible, this tutoring provided one-to-one (or sometimes one-to-two or -three) training, including hands-on use of the applications.

Group Trainings in Microsoft Word, SuperPaint, and Microsoft Works database were also offered after the installation process was well along.

The two most powerful strategies employed during this stage, however, were 1) introducing computer solutions based on basic tools, and 2) peer support.

Introducing Computer Solutions Based on Basic Tools

As part of the previous Installation phase, the Needs Assessment II process involved identifying tasks that could be done more efficiently with the help of the computer. Tasks that were repetitive, time-consuming, and detail-oriented and that could be addressed using only the basic tools of word processing, spreadsheets, or a simple database were identified.

For many users, the basic tools were all they would ever need. By applying basic tools to tasks in their work areas, users immediately began to build confidence in their ability to use the computer and at the same time could see some immediate benefits. They learned that solutions to some of their work needs were within their ability to master. For example, the bookstore created a simple inventory and ordering database, the Financial Aid office created a spreadsheet to track overall allocation of available funds, and everyone began creating memos and correspondence using word processing. Several users immediately began using graphics to spiff up signs and notices around the building, as well.

Users also became more knowledgeable about designing solutions. When a more sophisticated solution was needed, the users who had first worked it through themselves were much more sophisticated participants in the design process than users who had not.

Peer Support

It is not possible for a support staff, no matter how large, to respond to all the needs of users. A network of users with higher levels of expertise who may be able to answer the more immediate questions of their peers greatly reduces dependence on the paid staff. Individuals within the organization who showed a particular interest in or skill with computers were indentified. As each functional area of the organization received its computer, one individual was designated as the Computer Kahuna for that group.

The Kahunas were an important part of the "peer support" strategy; each functional unit of the University (Admissions, Registrar, the four degree programs, etc.) had a Kahuna. Meetings were held regularly with the Kahunas to provide special training in all aspects of the Macintosh and to discuss proposals for installation priorities, training strategies, support, and other issues. Their feedback was sought. They were encouraged to provide information on how the users in their areas were doing. In the context of user-oriented design, they provided a great deal of representative feedback about the users' experiences (good and bad) and needs (existing and potential).

The Kahunas were a sort of cultural cadre, a group of people who helped set the tone of the entire computer culture. To the extent that they were well-informed and able to get the

computer to work for them, they communicated a confidence and enthusiasm that affected their workgroup. As they became more knowledgeable as a result of the special training provided, they became increasingly valuable as codesigners and coplanners of the computing system. They were a key factor in the culture-building process of creating and reinforcing desired values and attitudes. But their most important effect was to reduce the demands on the few computer support staff. Users would come to their local Kahuna for help; Kahunas would come to the computer staff only with the questions they could not answer.

This network of peer support was entirely *voluntary*. Kahunas had their own work to do and often were unable to take the time to deal with support questions. Sometimes their supervisors intervened (especially after the computing system was well established) because they felt Kahunas were devoting too much time to computers and not enough to "real work." But in general, the cooperation and support of the Kahunas was a vitally important factor in the success of the early stages of development.

Stage 4: Network Implementation and Training

When most of the individual workstations had been installed, attention turned to networking them together. Sharing printers was the first objective, followed by the introduction of electronic mail and a central file server.

Planning the Network

The Computing Advisory Group developed a plan for the physical network and was instrumental in planning its introduction. They used a "passive star" configuration of twisted-pair telephone wires. Their first objective was to link workstations in the same part of the building together with the printer for that area. When the branches were complete, they linked them together, and thus provided user access across the network to the central file server and the single LaserWriter printer.

Introducing E-Mail

E-mail systems are most successful when as many people as possible begin using the system at the same time. The idea is to reach a sort of "critical mass" quickly so that a person sending a message has a reasonable expectation that it will be read and returned in a reasonable amount of time.

The Computing Advisory Group tested the system to isolate potential problems and establish which options worked best. Next the Kahunas were trained and brought online, followed shortly by open training sessions for the rest of the organization.

Before gaining access to the system, a person received some basic training in how it worked and agreed to the following: they would check their mail at least once each day they were at work and send at least two messages per week. This agreement ensured that there would be

mail traffic and that messages would be read. Each new user was greeted with a welcoming message when they signed on for the first time ("Oh, I already have mail!"), reminding them of this agreement.

Using e-mail the first weeks was a lot of fun. At the Community Meeting on Tuesday morning, the topic of e-mail would come up and the room would erupt into stories of messages sent and received, many with a humorous content. The users were having fun;at the same time they were learning the potential for (and limitations of) this unique form of communication. As e-mail became more familiar, it became much more work-focused and serious. But the element of humor that had been there from the beginning still remains.

Introducing the File Server

Few users understood the concepts of networks and file servers. By introducing e-mail first, they were able to see the system in action before addressing themselves specifically to what made it work. (The file server was also the central "mailbox" for e-mail.) Again the use of the file server was piloted among the Computing Advisory Group members. And again, the Kahunas were trained in this new resource first. Potential uses among workgroups were suggested, such as the compilation of the quarterly class schedule. "RegSys," the multi-user registration and student information system, and other databases now reside on the server and allow read-only access by users from any workstation.

Stage 5: Project Development and Support

The self-reliance built into the system worked remarkably well as users were learning to use the computers and beginning to develop their own uses for them. It is an axiom of computing, however, that as users begin to understand what the computer could do, they want it to do *more.* Several advanced users became quite good at developing projects. A sophisticated spreadsheet/list-merge system for issuing award letters in Financial Aid was the work of one motivated person who tackled the computer and got it to work with assistance as needed from the computing staff. Many projects, large and small, were developed in this fashion. Inevitably, however, the projects envisioned by users outstripped their ability to address them with the basic tools available. At this stage, the computing staff began to take on developing solutions for users.

These solutions covered a wide range of sophistication. For example, the registration system ("RegSys") that had been under development for some time involved a complex relational database; the "Admissions Process Tracking System" (APTS) became a sophisticated HyperCard system; the automation of the Financial Aid award letter procedure involved writing some Tempo II macros; and the linked spreadsheets for budget tracking and development in Excel provided the computer-wary Fiscal Officer with a readymade tool.

Each project employed a design process similar to the one used during the installation of the hardware: needs assessment, collaborative design, implementation and feedback, testing, and installation. Users were included in all phases of the process so that the resulting product would be something they would use to accomplish their intended purpose. (We were not

always entirely successful at this goal!) Users who had created solutions for themselves using basic tools were usually excellent participants in the design process because they had gained an understanding of the capabilities and limitations of the computer and how their work could be supported by it.

With each new project completed, supporting that project began. No computer project works perfectly the first time, nor is it implemented without users wanting to make last-minute changes. And, of course, computers all break at some point, either due to bugs or some outside (and unforeseen) interaction. The significance of these facts is that a project is never really "done." *Each new project given to users adds incrementally to the workload of the support staff.*

Stage 6: Data Management

Data management involves collecting, tracking, storing, retrieving, or calculating pieces of data (like names and addresses). Most projects in the previous phase focused on organizing data that was already being collected by hand (for example, the number of students receiving financial aid and how much they received). As the computer's unique usefulness for dealing with data was demonstrated, however, the possibilities for organizing data also began to materialize. Data that had not been collected previously now became interesting because it was *possible* to collect and organize it easily.

This developmental stage begins shortly after the Project Development and Support stage begins and evolves concurrently with it. As projects developed by the computing staff demonstrate what the computer can do, users gain a better understanding of how the computer can assist in their work. As this understanding grows, so does the sophistication of the projects being requested.

For Registrars and Admissions Officers, this stage is the "first fruit" of the whole process. Registrars and Admissions officers: begin to use the computer tool for data already manage: the hand-generated graduation list, for example, or the names and addresses of people who applied for admission this month.

The rule is to *start simple!* Gain experience with using the computer for data management on easily manageable projects. Learn the computer's limitations and strengths. Get used to going to the computer instead of a file drawer. Pay particular attention to who needs access to what data in the office to help understand if the number and location of computers is working. Experience will give participants more skill in designing more complex database projects. (See "Homegrown or Off-the-Shelf" below.)

Stage 7: Information Management

Managing data is one thing; managing *information* is quite another. Data are just bits and pieces that by themselves have little meaning. Information, on the other hand, can be used as a basis for making decisions; it has a coherency, context, and reference base that make it

useful as an indicator of what action to take. The *potential* of good data management is good information management, but it exists *only* as potential unless two conditions are present:

- 1. The data management structure allows data to be aggregated, compared, and analyzed in such a way as to produce meaningful information, and

- 2. Management understands the value of converting data to information and can provide direction to the data management system to meet its decision-making needs.

The data management structure needs to evolve toward a common set of standards for data and data exchange. Ideally, data management projects would occur in the same environment (i.e., using the same application). In most cases, however, users use whatever is at hand (and/or already familiar to them) to do the job. Early on in the project stage, for example, one user created a mailing list in SuperPaint (a drawing program). She was able to produce the labels she wanted, but the names could not be sorted, much less exchanged with another user. On a larger scale, the Admissions Process Tracking System created by a user in Admissions did not have some of the data necessary to move admitted students into RegSys (the registration system).

Guidelines for storing data can evolve as the level of sophistication increases. When the database in one area (such as Admissions) needs to interact with the database in another area (Registrar's Office), however, the standards should be clearly defined. When exchanging data, not only is the *structure* of the database important (Is there a middle initial field? Is the area code field separate from the phone number?)but the *format* is also important (Is there a period after the middle initial? Are state names spelled out or abbreviated with two-character codes?). On a more technical level, the data *types* should also be congruent (Are phone numbers stored as a text field or as numeric?) A period of proliferation *without* strong guidelines is probably useful for building the experience base of the user community so that the value of *having* guidelines will be better understood.

The management issues are more complex. An information management system exists to support the work of the organization. In its early stages, each organizational subsystem applies the computer tool to its own work, usually without regard for how this application will connect with other organizational subsystems. This tendency is particularly strong if management is not actively encouraging codevelopment.

Secondly, data management is limited by the accessibility of computers. For example, the Registrar's Office was ready early to do away with much of its paper-based tracking system. With only one computer for the office, they did not have adequate access to the computerized data to take this next logical data management step. Management needs to understand these limitations and plan for sufficient resources to achieve a sort of "critical mass" of data management that makes information management possible.

Finally, and most importantly, management needs to be able to determine what information is most important to its decision-making process. This determination can then provide direction

to the computing staff to focus their data management efforts. Without this direction, the typically overextended resources of the computing staff tend to go toward "squeaky wheels" and projects of interest to them rather than to focus strategially on projects that directly serve the organizational mission.

"Homegrown" or "Off-the-Shelf"

A data management system for tracking students' progress through the school from first inquiry to graduation (and beyond) is the ultimate dream of a computer-savvy Registrar or Admissions Officer. However, such a data management system (or series of systems) is extremely complex and should be approached incrementally and with great caution and patience.

Customized software has the potential to give users their own way in using the computer to do their work. Although there are times when a homegrown solution is clearly indicated, conventional wisdom in the computer industry is that a customized database is usually *not* the preferred solution for a number of reasons.

Customized databases *always* involve more resources than expected often twice, three times— and even four times as much time (users'), money, and months as was allotted.

A certain amount of agony and angst is required. Who is involved in decision-making? What conflicting investments are there among this group? While users are closely involved with decisions about what's included and how it works, things often don't turn out as they expected. Is it worth changing? Who pays for the change? Will the new version be better than the first? And then there are the seemingly endless "bugs."

The temptation to want a customized database to do *everything* is almost overwhelming—and thus the resultant project can become overwhelming, too. Keeping focused on designing a database to address 80–90% of the work needs is a real challenge because it is the special cases (the 10–20%) that are the most intriguing.

Users are at the mercy of the database developer to whom the project is given. If the programmer has problems with other projects, scheduling conflicts, or personal issues, the customization is likely to be affected. Whether working with an individual or a firm, be aware that the intimate working relationship lasts for the duration of the project.

There are often existing database management systems that meet specific user needs (or most of them) that are the result of someone else's investment of time, money, and angst.

To repeat, the project *always* takes longer than anyone thinks it will.

"Off-the-Shelf" software has its own pitfalls, however.

Packaged software is usually designed to meet the most general needs of potential users. If institutional needs are distinctive and not like the general needs of most users, there is not likely to be an existing package on the shelf.

Software may meet 80% of the requirements, but if one function critical to the operation is not included, the whole package may be useless.

Rarely can packaged software be plugged in and used "as is." Often extensive additional programming is required to adapt the software to a school's particular needs. In some cases, the "adapting" turns out to be almost as resource-intensive and time-consuming as a customized database would have been.

Existing software may not provide a user-friendly interface that will assist users in learning and using the program. No matter how well the software performs the desired functions, if it is not easy to use, unnecessary resistance and frustration will result.

In any case, proceeding without initiating a database project, whether "homegrown" or "off-the-shelf," or without hiring a knowledgeable consultant is not recommended. A consultant hired up front can save a lot of money and grief later on. The consultant can help to determine *actual* (as opposed to *perceived*) needs; help decide whether a custom or packaged solution is needed; and help you find either the right existing software or the right database developer.

One last word. Resist the temptation to simply computerize the way you already do things. *Use the design of a database project as an opportunity for a thoroughgoing analysis of the overall system of operation—and design a better one.*

CONCLUSION

This paper is derived from day-to-day experience in the successful introduction of computers to a small school and development of a database. Some factors were unique to the situation at Antioch University-Seattle, and certainly the personalities involved there influenced that process. The principles described, however, provide the basis for the successful implementation of a new or significantly enhanced computer system in any organization. The stages of development provide a guide to determining where the institution is in the process and, more importantly, what is appropriate to its stage of development. It reaffirms the importance of involving the users of the existing or potential system in every phase of decision-making to give implementation an excellent chance of succeeding.

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Stress Management in the Workplace

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Unless you've been in the news because of state budget cuts, workers outside our realm probably see academic administration and faculty leaders perpetually enjoying a calm, cerebral life on a bucolic campus, immune to the competitive pressures of the outside world. Right?

Unfortunately, most campus administrators paint a different picture. We see our daily work as a helter-skelter effort to put out academic fires and soothe enraged colleagues. We see ourselves beset by too many problems demanding resolutions in too short a time. We are required to listen to students, faculty, staff, parents, alumni, taxpayers, politicians, and community leaders, most of whom have a grievance or a policy that they think should be adopted quickly.

The plain fact is that colleges and universities are increasingly becoming hotbeds of stress. Contrary to folklore, we often work 45 to 50 hours a week. We wrestle with demands for higher quality within shrinking budgets.

Even at the better colleges and universities—and among the most conscientious persons—the levels of stress have risen appreciably in recent years and are likely to get worse in the 1990s. Colleges need to plan to deal with this growing problem.

What Is Stress?

The body's physical, mental, and chemical reactions to all the things that surround it and impinge on it.

Misconceptions about Stress

- Stress is always harmful to persons, performance, or productivity. (Actually, mild stress sharpens human performance.) So, stress is not all bad. Like exercise, a certain amount of stress tones our system and helps us to maintain a state of readiness for tackling problems and reacting to our environment. The problem with stress arises when it becomes distress.

- Stress mainly affects the emotions, and affects one's judgment and thought processes secondarily. (Studies show chronic stress results in physical changes in the body as well.)
- A stress prone individual is beyond help. (Experience suggests that people can change gears if they are sufficiently informed and motivated.)
- All women and men react similarly to stress conditions. (Research shows that a person's beliefs, expectations, allegiances, and personality affect one's susceptibility to stress-induced malfunctioning, not male versus female factors.)

Ironically, stress is neither positive or negative. It is neutral. It is beneficial when it triggers growth and improves performance; it is destructive when it produces irritability, mistakes, headaches, alcoholism, and burnout.

Stress is like a violin string. Too little tension produces a dull sound, too much snaps the string.

In the absence of stress, high-quality job performance is often absent as well. As stress increases, performance tends to increase because stress makes demands on an administrator's resources to meet the requirements. Moderate stress is a healthy stimulus and an antidote to boredom.

Characteristics of Those Who Seldom Experience Stress

Those who seldom experience stress ...

- have high self-esteem and believe they can improve themselves;
- believe they, not fate, luck, social forces, or nameless powerful groups or persons, control their lives;
- are involved in, or committed to, important activities;
- are undisturbed by uncertainty and ambiguity; and
- view change as a challenge.

A vast amount of stress research has focused on the well-known, so-called Type A personality. Type A's are hard-driving, aggressive, energetic, ambitious, and seem to thrive on action and a fast-paced life. They are highly competitive, constantly setting new goals, and they work fiercely to succeed.

Type A's seem ideal to many colleges and universities as take-charge presidents, vice presidents, deans, registrars, and admissions directors. Such persons surmount crises and never give up.

Here is a true evaluation of one such Type A at one of your campuses.

> The man doesn't know the meaning of the word fatigue. He drives himself without mercy. At meetings he's supremely confident and forceful. He is urgent, impatient, irritable, a perfectionist. He rubs some people the wrong way, but we're happy to have him.

Type A personalities seem immune to academic stress. But, in fact, they frequently suffer from high blood pressure, family problems, heart attacks, and even early death.

What are the major causes of stress in a college or university environment and what are the warning signs of stress in employees?

Causes of Stress on a College Campus

Factors bringing on stress include ...

- insufficient time allotted for all the things a person is expected to do (A recent study found that 60% of department chairs felt their professional growth was being sacrificed because their time was consumed by departmental duties.)
- a poor definition of their role (not knowing exactly what they are expected to do)
- inability to satisfy conflicting demands
- not knowing what superiors think of their work
- a gap between their responsibility and their authority
- oppressively heavy workloads
- too many interruptions
- inadequate resources to accomplish their task
- the need to defend no-win decisions
- having inept or negative associates
- abrasive interactions with colleagues
- difficulty getting people to change or adopt new behavior
- superiors who are erratic, capricious, or never satisfied

Tell-Tale Signs of Stress on a College Campus

Too often the following signal stress is present on the college campus.

- diminished performance (may also appear in the form of careless mistakes or a sudden inability or unwillingness to make decision)
- perceiving issues as one of personal victories or losses, believing themselves imprisoned in a survival struggle
- constant tapping of fingers or feet
- increasingly strained relationships, more arguments, accompanied by diminished cooperation and withdrawal
- difficulty concentrating or an inability to pay attention

Someone with one or two symptoms may be faltering for reasons other than stress. Having multiple symptoms is probably a good indicator of stress overload. Too much stress can result in what we call "burnout." The term is borrowed from rocketry to denote the point when a missile has consumed all its fuel.

Coping with Pressure

The late Norman Rockwell was seen on a hill at his easel looking at his burning barn, watching the volunteer fire department douse the blaze. When asked what he was doing, he replied, "I can't stop the barn from burning, so I thought I'd capture it on canvas."

Many campus leaders have burning barns which they can't stop from burning; that is, they cannot avoid high levels of stress. But they can modify their personal behavior to lessen its effects.

Some of the preventive measures are simple:

- sleep at least seven hours most nights
- give and receive affection
- exercise regularly
- confide in one or more friends
- speak openly about your feelings and worries
- do something for fun regularly

Useful Coping Techniques

- *Chose your fights or flee.* It is appropriate to express anger when there are betrayals, unacceptable behavior, or serious breaches of conduct. Don't hassle over minor matters; give in occasionally even when you believe you are right. And try fleeing.
- *Find a safety valve.* Problems often seem worse if you carry their burden alone. Find a person you trust to help you sort things out.
- *Exercise.* Walking is great, too. Rather than sapping energy, exercise enhances it. It has a relaxing effect because it stimulates the release in the brain of endomorphins, the body's own morphine-like substance, which has the effect of a tranquilizer.
- *Set priorities.* Use these categories: essential, important, and trivial. Do the essential ones first, then important ones. Learn how to say no to the trivial ones.
- *Delegate.* Don't micromanage and try to control everything.
- *Laugh at yourself.* It keeps you sane.
- *Step outside your work.* It helps you focus on concerns other than your own.

What Can a Campus Do to Reduce Stress?

- *Role clarity.* Make sure that the duties and responsibilities of each position on campus are clearly defined.
- *Appraisals.* Be straightforward with employees. Lack of candor about a person's performance is perhaps the most corrosive and stress producing.
- *Work environment.* Is it pleasant, attractive, and low noise? Improve it if it isn't.

- *Administrative style.* Deans and presidents generally set the style, tone, tempo, and pattern. Guard against both issuing directives unless absolutely necessary and over-supervision.
- *Change.* Judicious handling of change is vital. Open discussions early before the change, provide reasons and documentation for the change, and allow those affected to contribute to the change.
- *Time pressures.* Give reasonable assignments with manageable time periods.
- *Physical fitness.* Good health and high energy are important to productivity and to reducing stress. Try the wellness movement with programs similar to those in place at Michigan State University and George Washington University. Selden, Peter. "Reducing Stress on Campus" *Planning For Higher Education.*

Two Principal Kinds of Stress

Stress 1: The body's autonomic system functions at a subconscious level, reacting automatically to certain stimuli in our environment.

When we are threatened, frightened, or feel sudden tension, our body goes into the "flight or fight" mode. Our adrenaline increases so we can react in a "flight or fight" manner.

Stress 2: A second kind of stress, vigilant reaction, manifests itself via a chronic state of helplessness. Instead of having the alarm chemicals (like adrenaline) pumping through our system, the vigilant reaction stress releases corticosteroids and keeps the body in a constant state of survival. Corticosteroids are normally released when the body is faced with war and famine over a long haul. The body has to deal with cold, hunger, and a lack of water and salt. The vigilant reaction actually helps our body to maintain internal control in the face of a chronically hostile environment.

The release of corticosteroids from the adrenal cortex slowly increases blood pressure, retains sodium, decreases the production of sex hormones, increases gastric acid production, diminishes immune responses, and creates a chronic state of arousal that primes the body for long periods of adversity.

For example, an employee faced with blaring telephones, a demanding and ever-present boss, and a computer system on the fritz may well have an excess of adrenaline looking for a flight or fight. On the other hand, a person enduring a long-term destructive relationship from which he or she can see no way out may feel an overwhelming sense of helplessness and, finally, hopelessness.

The problem with stress, then, arises when it becomes distress, when our alarm system gets triggered so indiscriminately, or our vigilant response is heightened for such a prolonged period, that we can no longer recognize when our bodies are reacting to important issues or are just in tune with a stressful environment.

The problem is that we are constantly sending either alarm or vigilant signals to our cardiovascular system, central nervous system, and internal organs via the hormones that govern these responses. So, here's what happens: an excess of adrenaline and nonadrenaline can damage the electrical conductivity of the heart, affect blood pressure by producing rapid changes, and affect platelet aggregation by making platelets stickier and thus increasing their adherence to arterial walls. All this promotes possibilities of irregular heartbeats, hardening of the arteries, and thrombosis.

Vigilant response is accompanied by a chronic sense of feeling trapped. Blood pressure slowly creeps up over time; the body retains salt, and, ultimately, fluid; increases in gastric acid occur (look out for ulcers); one's sex drive diminishes. A person suffering from vigilant stress over time becomes more susceptible to chronic illness. The only hope for truly managing stress, and avoiding burnout, is to achieve a successful internal dialogue. Dr. Murray H. Rosenthal, M.D., "How to Win the Burn-Out Game."

Causes of Stress

- pressure to get the count up
- information overload
- lack of recognition
- major reorganization
- constant rejection
- poor lines of communication
- impossible bosses

Stress — What the Critics Agree Upon

While a little stress can be healthy, too much can deplete your energy. Gaining control of stress is essential to attaining and maintaining not only top job performance and productivity but physical health and peace of mind as well.

The Warning Signals

When you're under stress, your body *always* lets you know. Whether you choose to listen to it is another matter. Given the findings of Dr. Roy Meninger (Meninger Foundation), 75% to 80% of reported illness is stress related; can we afford not to listen to our warning signs?

The most common response to stress is to take a few antacids and snap at the kids once in a while. If this is how you cope, chances are you are denying that your stress even exists. Chronic stress can upset your hormonal balance and reduce your resistance to all kinds of diseases. Health problems associated with stress include colitis, high blood pressure, strokes, heart problems, asthma, arthritis, allergies, and certain skin disorders.

The irony is intense pressure can make you too tired and sick to perform at peak levels. A recent survey of 600 fulltime American workers conducted by N. K. Friedrichs and Associates in Minneapolis for Northwestern National Life Insurance Company concluded that three out of four Americans now report being stressed out in their jobs, many to the point of burnout. What about the other 25%? More often than not, they've learned how to effectively control stress.

The Hardiness Factor

Suzanne Kobasa, Ph.D., psychology professor at the City University of New York, has researched what she calls the "hardiness factor." She concludes that it isn't the stressful event or experience per se that produces symptoms, but how a person handles that stress.

Essentially, there are three general attitudes hardy people (i.e., people who cope with stress in a constructive manner) share. These are known as the "three C's."

- They see life as a *challenge*, not as a threat or a series of hassles.
- They're *committed* to what they're doing. They have a mission or purpose in life—an overriding belief that what they're doing is both right and meaningful.
- They feel they have *control* over their lives. They don't feel they're helpless victims, nor do they worry about not being able to handle catastrophes.

While we may suspect that some people are born hardier than others, Kenneth Pelletier, a Stanford University stress expert, says that much of this behavior can be learned by anyone.

Action Plan to Reduce Stress

- The first and perhaps most important step is to take 15 minutes out of your schedule to complete this process. If you can't find the time for this, get help fast!
- Make two columns on a piece of paper and label them "Work" and "Personal." As they occur to you, quickly write down all the things in each category that drive you crazy.
- Then, identify the biggies with an asterisk (*).
- Separate the causes into *chronic* (those that are an ongoing part of your life, such as a difficult boss or family illness) and *acute* (problems that will pass, like a short-term project or upcoming deadlines).
- Then ask yourself, "What do I need to do right now to reduce the stress these problems cause?" Your answers may be as simple as "Get a good night's sleep" or "Call the department head and nail down the uncertainties."
- Next, plan to take that action.
- Now consider the big picture. Prioritize your daily needs and decide what you *can* do—what actions *you can take*—to achieve results.

If you're overburdened at work, separate the urgent from the merely important and do the important tasks later. Wow! This is contrary to what you have learned about management; but remember, you're dealing with a stress problem. Delegate! Take a stand; ask someone for help. If you need to be more nurturing toward your body, find an exercise program you enjoy and do

it. It's common knowledge that exercise is the closest thing to an "inoculation" against stress. If it's your spirit that could use refreshment, try a relaxation technique; meditate, pray, sing—whatever puts you more at ease. Get support! Make time for a social life, schmooze, and enjoy life.
(Fisher, Sandra Lotz. "Vital Signs," *Sales & Marketing: Management.*)

Dr. Peter Hanson, author of *The Joy of Stress* and *Stress for Success. How to Make Stress on the Job Work For You*, estimates that stress-related illnesses cost U.S. Industry more than $150 billion annually. A 1990 study by Cornell University Medical School, New York, found that job stress can triple the risk of high blood pressure and cause potentially dangerous physical changes to the heart.

This is what some companies have done to reduce stress:

- Executives at H.J. Heinz Company and Lotus Development Corporation enjoy in-the-office massages. Connie Clifford, Naples, Florida, registered masseuse, explains that even some hospitals are using massage therapists in the healing process; the Florida Legislature uses a seated massage program.
- National Computer Systems in Minneapolis uses a hired comedian to relax employees and spur creativity.

- New York Telephone attempted to improve employee health and productivity via a number of individual-level stress management interpretations such as meditation and relaxation techniques.
- Control Data Corporation's "Staywell" program targets employees' health risks by exercise, smoking cessation, hypertension screening and control, weight control, and nutritional counseling, as well as stress management.
- Johnson and Johnson's "Live for Life" program emphasizes stress management.
- Insurance companies have been in the forefront of stress-management programs (e.g., in 1982 Equitable Life embarked on its Emotional Health Program, including referral of employees to an inhouse clinical psychologist, physician, and/or counselor).
- Northwestern National Life Insurance Company offers a free stress booklet to companies interested in evaluating their need for stress-management programs (contact Northwestern National Life, Route 6525, P.O. Box 20, Minneapolis, MN 55440).
- 3M also does a great job.

Stress research indicates that neither the amount of work nor the work rate appears to be as critical as the amount of personal control or discretion the employees exercise over these demands. In addition to taking job-redesign considerations into account, it is important to help the employee learn how to recognize and handle stress. You can't change behavior overnight; stress management programs take time.
(Maturi, Richard. "Stress Can Be Beaten," *Industry Week: The Management Magazine for Industry.*)

Evidence suggests that eating right can minimize some of the adverse effects of stress on the body. Recent research shows that the more common, non-physical stress causes as much or more hormonal and metabolic response in the human body as does the physical-related counterpart.

When subjected to psychological or emotional stress, the body begins to react in different ways. The mineral most affected is generally calcium. Most people think of calcium for strong bones and teeth; however, calcium plays an important role in keeping the heart beating and an important role in impulse transmission in the nervous system. These two areas are vital during periods of high stress. Research has shown that stress appears to decrease the amount of calcium that is absorbed during digestion, and it also may increase the amount that is excreted by the body. For women calcium is especially important because it is one of the two minerals most deficient in the American woman's diet (the other being iron). The best dietary sources are dairy products, sardines, salmon, various types of nuts, and leafy green vegetables.

Vitamin C is also adversely affected by stress, it helps the body better cope with stressful situations. Stress causes the body to produce adrenaline, which in turn depletes its store of vitamin C. This is the reason many people feel drained after a particularly stressful situation. Also, the rundown feeling from loss of vitamin C can leave you open to low-grade infections unless the vitamin C supply is replenished. Eat citrus fruits, berries, tomatoes, cauliflower, potatoes, and green vegetables.

By far the most important nutrients related to stress are the B complex vitamins. They are *not* stored by the body; any excess is excreted and, therefore, must be replaced daily. These vitamins

are synergistic, meaning they work better together. Sources of B vitamins include liver, pork, whole grains, most vegetables, milk, fish, eggs, nuts, wheat bran, cantaloupe, cabbage, and blackstrap molasses.

Meals to Combat Stress

It is usually good to follow the 80/20 rule when planning your meals:

50% complex carbohydrates (fresh fruits, vegetables, whole grain bread and cereals, pasta)
15% lean protein (fish, chicken, turkey, eggs, and milk products)
15% quality fats (safflower, corn, or olive oils, salad dressings, and creamy sauces)
20% whatever sounds good (chocolate chip cookies, ice cream)

Remember that 6 of the 10 leading causes of death, including heart disease, diabetes, and stroke, are directly related to stress and diet. (*Balancing Stress with a Balanced Diet* by Kenton W. Renicker and Brian H. Kleiner)

What's Hot in Institutional Research in the Nineties?

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What's "hot" in institutional research (IR) in the nineties is an interesting question. The answer is imbedded in the theme of "accountability," which is at the essence of higher education in the nineties. But in order to be able to answer that initial question properly, one needs to understand the function of institutional research and the brief history of its evolution.

The Origins

Institutional research is defined here as the collection, synthesis, analysis, interpretation, and dissemination of data and information for the purpose of administrative decision making within the institutional context.

Historically, the institutional research function was conducted in a disjointed, haphazard fashion, whereby various personnel were given the responsibility of completing external reports, evaluating specific programs, and occasionally conducting surveys to gather public or student opinion (usually in preparation for accreditation). No single individual or office coordinated the efforts or knew the status of the activities. The result was the creation of many different data sources with no consistency or, necessarily, accuracy. An institution could very easily report its enrollment differently each time a query was made. Such actions only led to confusion about and gross mistrust of the accuracy of institutional data.

The advent of additional external reporting requirements mandated by law (for example, Civil Rights legislation, the Vocational Education Act of 1963 and the Amendments of 1968, and the Higher Education Act) quickly made presidents realize that the reporting function had to be centralized, controlled, and monitored by a single office or individual in order to be effective and to comply with the law. The institutional research office appeared to be most appropriate for this reporting function, and, therefore, that area was designated as such and entrusted with the external reporting function.

Since the reporting focused on statistics, many presidents selected mathematics or science faculty with an interest in statistics to fulfill their need. However, no matter how excellent they may be at pedagogy, most institutional teaching faculty are untrained in the applied form research methodology used in higher education administrations. Around the same time, in the sixties, teacher education institutions began to educate persons obtaining Ph.D.s in the area of higher education administration with an emphasis on institutional research or education research as a specialty.

Individuals with doctorates in the education research/institutional research area were educated in the intricacies of higher education administration, including governance, policy decision making, staffing, personnel negotiations, finances, resource allocation, facility construction, and student/academic affairs, as well as in research beyond that of a "number-counter." The traditional institutional administration, however, has often failed to distinguish the difference and continues to underutilize the potential of the institutional researcher.

"The fact that rigorous research design and methodology are impossible to use or are considered irrelevant for most educational decision-making is no excuse for retreat to a pooling of ignorance by uninformed majority vote or to an enforced acceptance of the judgments and decisions of authority, however great the claimed or recognized expertise" (Dressel 1976, p. 2). Even though theoreticians have dissected the decision-making process into models and diagrams, the actual process itself is very complex and multifaceted. The impact of decisions has not been well-defined, nor has the impact of extraneous pressures and constraints (fiscal, political, social, and temporal) upon the decision itself been explicated.

Decisions based solely upon objective research are not always necessarily the best decisions. The institutional researcher can utilize planning and evaluation techniques to explore alternatives, to project ramifications of various decisions, and to prioritize the best decisions. Both the evaluation and the decision should be tested for validity (especially internal), reliability, and objectivity. There must be continual information gathering, review, and recycling of information regarding the decision to ascertain its full impact (Mehallis 1981).

Change in Roles

Institutional research, possibly more so than any other function in higher education, has been transformed by the advent of the personal computer (PC). Traditionally, institutional researchers functioned as gate keepers—sentinels—of the vast wealth of knowledge which languished within the data files of the university (see figure 1). They dispensed data from the mainframe when necessary. Proactive offices developed reports and information systems which enabled them to dispense data in anticipation of the real need for it in the decision-making process. This was the era, or the heyday, of the Fact Books and the Office of Institutional Research (OIR) Data Reports. "Good" institutions viewed the OIR as the primary institution which provided the "Bible of information" upon which institutional policy was made. Schools of Education in the sixties and seventies developed majors in institutional and educational research. One of the pitfalls of such an approach was the propensity to become data rich but information poor.

The advent of the personal computer in the eighties changed the entire process by which data/information could and *would* be accessed by institutional decision makers. PCs, through the use of institutional networks, could directly access information on the mainframe, thereby by-passing the institutional research gate keeper. In other words, the "access gates" were opened. Data processing has, for the most part, become a distributed process. The role of the Chief Information Officer has become a purely administrative function to maintain the network and mechanics of processing data. Even the president can physically access data from her or his own office. So what does this phenomenon in higher education mean to the IR function? It means that the role and function of that enterprise has had to evolve in order to remain viable.

The new role of the institutional researcher is one of information analyst/consultant (See Figure 2). It is at a higher level in the policy development process, and is one which focuses attention on the meaning, or "richness," of the data as information and educates individuals in its uses within both the local and external environment. It utilizes historical and current data to extrapolate trends and to project possible futures. The pure "number crunching" days are over. Both quantitative and qualitative analyses are vital. It is necessary now to develop and/or apply new methodologies, such as Lincoln and Guba's (1985) naturalistic inquiry and Tierney's ethnography (1991), which combine the qualitative, "people" data with the frequency counts. Using multiple methods and integrating the findings with techniques, such as triangulation, provide cross validation of the "true" picture. Such approaches can provide a wealth of knowledge for admissions officers and registrars involved with enrollment management.

What's Hot in the Nineties?

As attention becomes more focused on students as the individuals the institution exists to serve, more care must be given to understanding these students and their needs and desires. The "buzz word" of accountability is currently the central theme emanating from institutions and from legislators who hope to get reelected by showing their constituents how accountable they are to them. Unfortunately, education has lost the public trust in the U.S. at this point in time, and has had to defend itself repeatedly against attacks in efficiency and economy from the nonacademic sector. As a result, educators must now *prove* their accountability to the general public, and specifically to State legislators. Since institutional research focuses its attention on institutional concerns, accountability is, then, the major thrust of the institutional research efforts in the nineties.

There are three basic foci of higher education accountability in the nineties. How do we hold ourselves accountable to current and potential future students in the domains of: (1) the institution (campus related); (2) the individual; and (3) the external environment (homelife) as it relates to the individual student? These are the realms for which we are truly accountable and these are explored below.

Accountability: The Institutional Perspective

Assessment is generally defined by a measurement of progress toward goals. Assessment of educational outcomes should be an integral and continuous part of the educational enterprise. When dealing with pure measurement or data, quality depends on data integrity, validity, and reliability of the measurement process. The primary reason for assessment in higher education is to go beyond mere measurement and move to internal planning and the development of educational policy. Movement beyond observation or measurement (data) results in information with value added meaning. When dealing with "information," quality becomes dependent on qualitative concepts, such as timeliness, relevance, and acceptability to potential users.

Unfortunately, the information age society has mostly reduced assessment to quantitative measurement. This has come about because there is a general sense that if measurement cannot be reduced to numbers, it is not real measurement. So often statistics take on a life of their own, and subsequently efficiency begins to dominate effectiveness. Quantitative measures look more

Figure 1

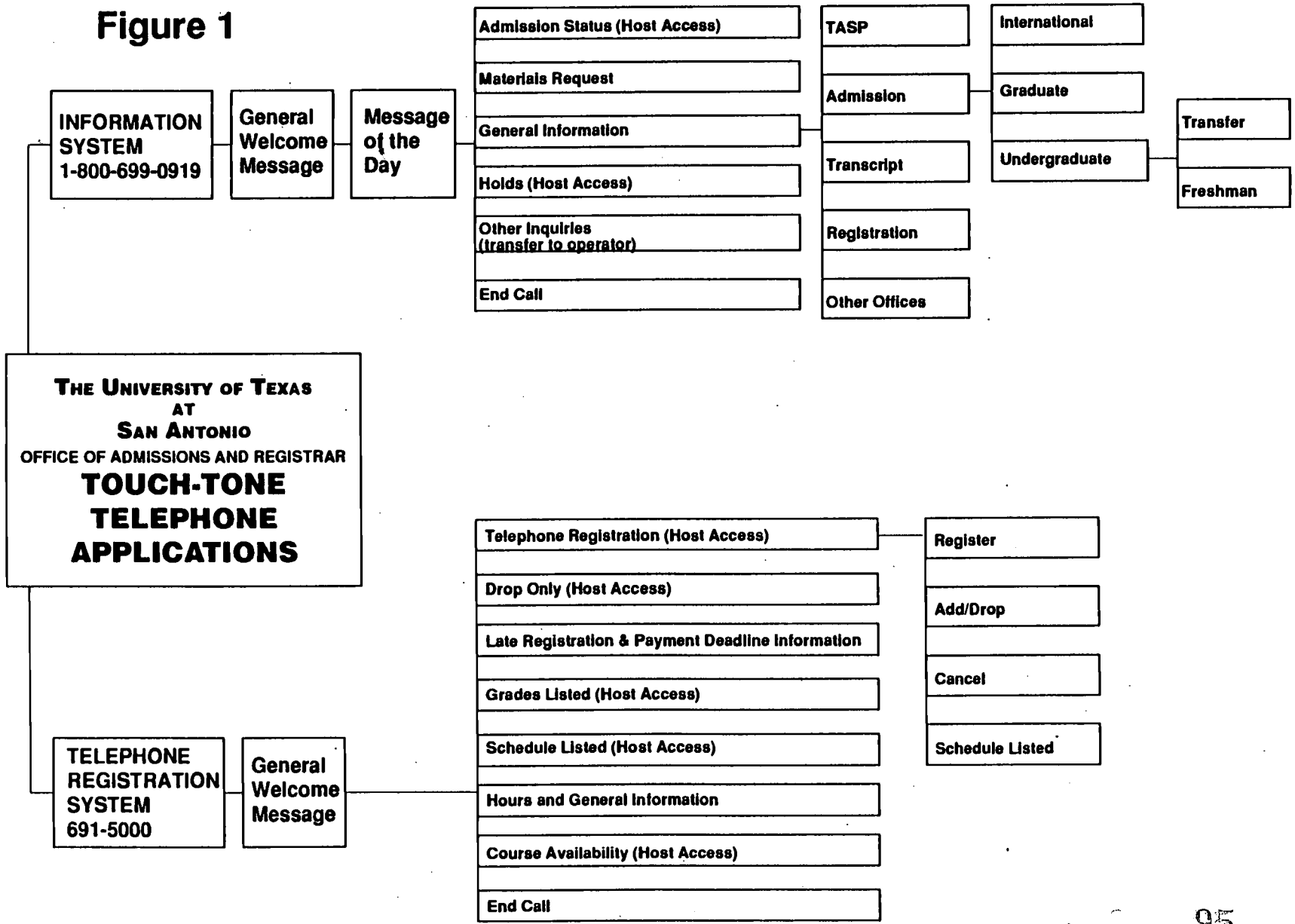
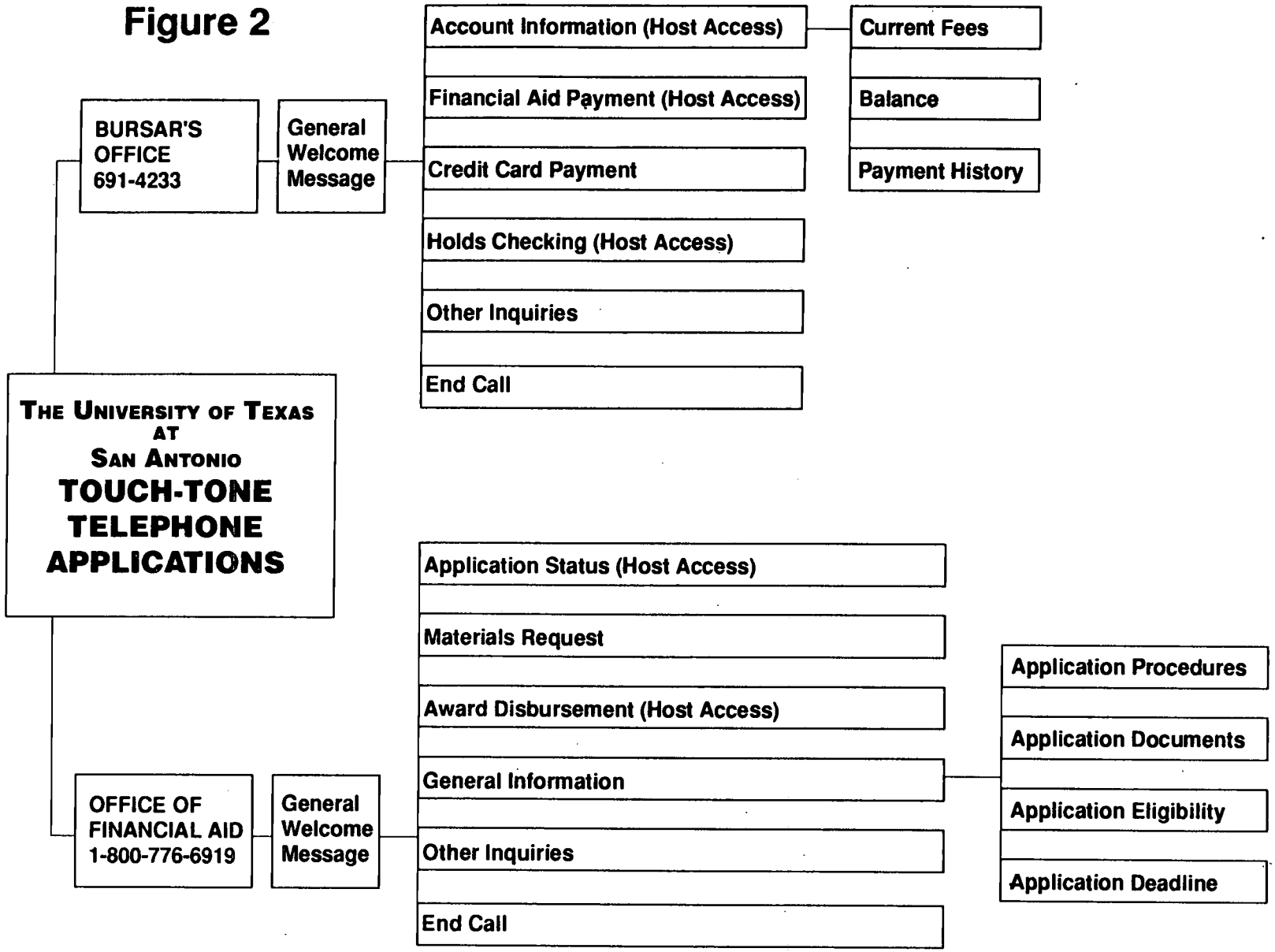


Figure 2


THE UNIVERSITY OF TEXAS AT SAN ANTONIO
TOUCH-TONE TELEPHONE APPLICATIONS
BURSAR'S OFFICE 691-4233
General Welcome Message
Account Information (Host Access)
Current Fees
Financial Aid Payment (Host Access)
Balance
Credit Card Payment
Payment History
Holds Checking (Host Access)
Other Inquiries
End Call
OFFICE OF FINANCIAL AID 1-800-776-6919
General Welcome Message
Application Status (Host Access)
Materials Request
Award Disbursement (Host Access)
General Information
Application Procedures
Application Documents
Application Eligibility
Application Deadline
Other Inquiries
End Call

precise, so a "false precision" is created in the assessment. The professorate and the institution have generally resisted such attempts, which imply a civil service approach. Therefore, in this time of public resource shortfalls, state governments have turned to the role of the assessors and the watchdogs of the public trust (Mehallis and Berry 1992).

When state governments define student outcomes and require institutions to report on them, they use results to determine resource allocations, i.e., the management perspective. Most state data requests reduce the assessments/accountabilities to numbers so that state offices can more easily deal with them. They begin to make comparisons, initially internally, and, later, among institutions. Comparisons of raw data which have been "crunched" are devoid of the qualities which truly define the context of accountabilities. Boyer and Ewell (1988) espouse the need for qualitative as well as quantitative evidence, but most state-level assessment efforts for accountability purposes preclude the qualitative portion.

The 1991 Florida Legislature passed benchmark accountability legislation for post secondary education as well as for the public schools. The Board of Regents (BOR) and the State Board of Community Colleges established task forces to draft accountability plans. For the Division of Public Schools, the Legislature created a new advisory body, the Florida Commission on Education Reform and Accountability (1992, p. 12), to develop recommendations on school improvement and accountability (Sections 240.214 and 240.324, F.S.). Briefly, the statute stipulated that the State University System (SUS) accountability process should:

- Provide for systematic, ongoing evaluation of quality and effectiveness in the system.
- Monitor performance in instruction, research, and public service, yet recognize institutional missions.
- Produce system wide performance standards and goals for each standard.
- Evaluate the production of classroom contact hours.
- Produce an accountability plan which includes, at a minimum, data on selected performance standards.
- Provide for an annual report on implementation of performance standards and achievement of goals during the prior year and initiatives to be undertaken during the next year.

The statute for the SUS also directs the Office of the Auditor General (1991) to assess the accountability plan, and the BOR to annually evaluate the performance of the Chancellor and the state university presidents in achieving the performance goals established in the plan (Post-secondary Education Planning Commission 1992).

The nine accountability measures mandated by the state of Florida are as follows:

- Total student credit hours produced, by institution and by discipline.

- Total number of degrees awarded, by institution and by discipline.
- Total number of contact hours of instruction produced by faculty, by institution, rank, and course level.
- Pass rates on professional licensure examinations, by institution.
- Institutional quality as assessed by follow up surveys of alumni, parents, clients, and employers.
- Length of time and number of academic credits required to complete an academic degree, by institution and by degree.
- Enrollment, progression, retention, and graduation rates by race, gender, and disability.
- Student course demand analysis.
- Classroom utilization.

Most of these accountabilities imply different things in different environments. For example, retention and graduation rates are based on different assumptions in traditional university settings, community college settings, or urban, distributed university settings. Legislated reporting requirements do not generally take this into account and, therefore, tend to legislate on the basis of the traditional university concept (based primarily on the view of the university when the legislators were in college).

As one can readily see, these measures, for the most part, have been reduced to quantitative data—devoid of the richer, qualitative aspects of the quality education which the institution hopes to offer its constituents. Therefore, Florida Atlantic University has decided to develop its own set of accountabilities (partly as a countermeasure to the Florida Legislature) which more clearly describe what the university is about. These accountabilities are as follows:

- Improve the quality of service to the nontraditional student (defined as employed, older, minority, commuting, returning, and/or family supporter).
- Provide optimal higher education opportunities to the populace of FAU's service.
- Integrate the university with the South Florida community by developing public-public and public-private partnerships and joint ventures, such as patents and technology transfer, and realizing environmental initiatives.
- Enhance commitment to continuing education by providing expanded access to continuing education for today's diverse population of students and potential students.

- Achieve or exceed female and minority equity in the hiring, promotion, and tenure of administrators, faculty, and staff by enhancing presidential and university administration commitment.

- Enhance quality of instruction by establishing a teaching development program and a plan for enhancement of teaching.

- Achieve or exceed the goals developed by each college for its accountability in teaching, research, and public service.

Accountability: The Individual

It is important to identify who we are as an institution so we can know where we are going. Enrollment data management and data integrity are vital in the process by which we describe ourselves in light of our missions. Student profiles and fact books generally only describe our frequencies but not our qualities.

The nineties require us to take a holistic approach to student data. Not only are the demographics important, but the qualitative lifestyle domain of the student is even more important. Although institutions cannot be all things to all people, research has repeatedly shown that the degree of support of the individual, moral as well as physical, helps determine whether or not that individual becomes a student. NCES (1992) statistics show that future populations which we must serve will be generally older and comprised of people of color whose native language is not English. It is important that admissions officers, registrars, and institutional researchers revalidate admissions criteria and policies as they relate in multiculturally diverse populations.

Accountability: The External Environment

The external environment impinges on both the students and the university itself. Outside constraints, such as lack of adequate funding and other resources, have direct impact on the quality of service which the institution is able to provide. Similarly, the outside environment which supports, or does not support, the individual student impacts the success of that student. A study which is currently in process by the author in collaboration with the University of Maryland-University College (funded through the PEW Charitable Trusts) is attempting to identify the effect which the external environment has on underrepresented students (i.e., African American, Hispanic, American Indian, and Asian American).

One of the goals is to identify effective practices to enhance access to higher education for minority and disadvantaged students. Another goal is to identify needed interventions and enhancements to increase success for minority and disadvantaged students in the institution. Underrepresented group members often are not from communities or families who encourage participation in higher education. If an individual from such an environment takes the quantum leap to enter a college or university, there often is no support structure in the external, personal domain which enables that student's success.

Minorities constitute an increasing proportion of the 18 to 24 year-old age group. By the year 2000, whites will represent a little over 2/3 of the college-age student pool, African Americans almost 1/6 of the pool, Hispanics nearly 1/9 and Asian Americans approximately 1/25 of the pool (NCES 1992). The college-age population will increasingly be comprised of minorities. Simultaneously, the groups that are increasing most rapidly are the poorest and least likely to be college bound. Hence, the fastest growing groups in the population will have the lowest educational attainment. As a result, the economy could be left without the qualified entry level workers it needs to maintain prosperity.

Summary

The basic issues still remain:

- How do we manage our information systems so that appropriate and effective data are collected?

- Are we condemned forever to data overload and information deficit, or are there minimal and optimal data sets which can be used to illuminate specific questions or issues?

- If this is the Information Age, what data should be public property, and what should be the private preserve of particular government agencies, universities, or institutes? (Berry and Mehallis 1993).

What's "hot" in institutional research? A lot! The entire configuration of higher education in the Unites States is changing. We can no longer stay isolated from the international/multicultural environment within our country, as well as outside it. We need to work together as a team to utilize the available technologies so that our information is richer and more meaningful as we plan beyond the nineties. The synergy which we can glean from combined efforts will take us beyond anything imaginable individually. There are many more questions than answers, but it is now the time to begin a new approach to finding the answers—together.

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Modern Voice Response Systems for Admissions, Financial Aid, and the Bursar

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In 1985, the Office of Admissions and Registrar established several goals to enhance our services to students. One of those goals was to develop and incorporate the most modern technology available to assist students with the everyday problems associated with attending college. The most obvious procedure that caused long lines was registration. Like many other colleges and universities, we began to explore what systems were on the market and determine which ones best suited our particular needs and which ones we could afford within our limited budget allocations.

Admissions and Registrar Applications

Evolution of the System

In March 1986, we contracted with Voice Computer Technologies (VCT) Corporation in Norcross, Georgia. This first system was an eight-line system which was upgraded to 12 lines by the time it was initially activated. We had a fully functioning system by June 1986, and began our first telephone registration in the summer of 1986, using VCT's Series 2000 machine. We were the first school in Texas to incorporate touchtone technology for registration. Within several months this system was again updated to a 16-line system that provided sufficient telephone registration to support a student body of 12,000. The VCT hardware was attached to an IBM 4381 central processor through an IBM 7171 controller. Since the first installation we have made major changes to the system. In 1987, another VCT 2000 was added to activate an additional 16 lines of interactive voice response for Admissions and Bursar inquiries and Financial Aid application requests. This system was divided into three parts; Admissions utilized eight new lines, and Financial Aid and the Bursar each operated four lines.

This VCT system of two Series 2000 16-line machines worked exceptionally well until the VCT company was sold to the Davox Corporation in 1989. Davox then informed us they were not interested in upgrading VCT systems and only intended to provide service for those in existence for five years. Since we were not comfortable with Davox's company policy, a search began for a vendor we thought would be in business for a longer period of time who could satisfy our particular needs.

During the search for new equipment we became interested in the PC approach to interactive voice response applications. We believed the PC approach would be more flexible for system changes. Additionally, most PC systems were much faster processors than the minicomputers used by VCT and other similar companies. In 1991, we converted our telephone registration

system from the Davox minicomputer system to a PC-based system. We purchased two 32-line 386 machines from the EPOS Corporation and asked them to write the associated software. We were then operating with two independent systems that provided backup we did not have before, and we were registering students in an average of two-and-one-half minutes; the previous system took an average of five minutes per student. We knew at the time we purchased the 64-line system that it would be too much for our limited IBM 4381 mainframe to handle. However, we wanted the backup capability provided by two independent 32-line systems and we were anticipating that we would soon replace the IBM 4381. That now appears to be the case, and we now anticipate that our full registration capability will finally be utilized for our current enrollment of 17,000 students.

In the meantime, because of service problems associated with outdated equipment, we took one of the 16-line VCT machines used for registration off-line and left the other 16-line machine (used for Admissions, Financial aid, and the Bursar) on-line.

We have been operating that way for almost two years. EPOS enhanced the software that ran our voice response system from VCT, so we have shifted the eight lines used in the Office of Admissions and Registrar to the new EPOS system. We now have 56 lines of telephone registration and eight lines of interactive voice response for Admissions inquiries.

System Applications

The eight dedicated lines for the voice response system are PBX trunks with stations behind a PBX. The lines allow the caller to be connected to a live operator. They cost approximately $40 per month per line. The other 56 lines require no PBX intervention. These lines are CENTREX lines direct from Southwestern Bell, the local exchange carrier, and cost approximately $20 per month per line.

Today, the system answers 53% of all calls to the office without operator assistance. Since our office averages 3,200 calls a week, this means that only 1,500 calls a week must be answered by admissions and registrar staff! This system does allow toll-free access if the student utilizes the tollfree number.

The 56-line system, however, does not utilize a tollfree number. We have no plans to incorporate this feature any time soon. However, the eight lines for Admissions information do have a toll-free number. These calls are expensive, but the tollfree number does help reduce the number of irate callers, because they realize they are not paying for a long distance call to seek information. The cost varies from $1,500 to $3,500 per month depending on the time of year and how close we are to an application deadline. Our application deadlines are July 1 for fall, December 1 for spring, and May 1 for summer.

On the eight-line part of the system, students can determine their admission status as well as what documents are still missing if they have not been admitted. The system allows students to dictate requests for materials by phone, which our staff transcribes each morning and enters into our mail request system. There is a module for requesting general information such as registration

procedures and there are instructions for requesting transcripts and other related information as well. The system will inform students when they have "holds" on their record and which office has placed the "hold." The system also allows a number of other inquiries and allows the caller to transfer to a live operator if other information is needed.

The 56 lines of telephone registration are also used in ways other than registration. Students may access their grades by telephone as soon as the grades are entered into the computer system at the end of the term. Students may access late registration and payment deadline information as well as have their class schedule confirmed, if they desire. The system allows students to inquire about course availability when they encounter closed sessions and need alternative sections and/or courses during registration. The system also informs students of the Admissions and Registrar office hours and other general information.

We have recently included an option on the 56-line part of our system that allows students to drop individual courses by telephone during the semester. This option will eliminate the need for students to stand in line to accomplish this task, especially during the final week, to drop and receive an automatic "W" or to generate a tuition refund if a drop occurs before the prescribed deadline. Figure 1 displays the various functions available using the touchtone telephone system in the Office of Admissions and Registrar.

Financial Aid Applications

The Financial Aid voice response lines and the information they disperse also evolved over the years, beginning with the incorporation of the system used by the Office of Admissions and Registrar. There are five separate modules associated with four lines. Students may determine their application status and which documents are needed to complete their file. Callers may also request materials such as a financial aid application, instructions on how to apply for financial aid, and other related materials. If the student has been awarded financial aid, the award is specified and the amount available for the award is stated. The system also has a general information module which informs students about application procedures, application eligibility, and deadlines, and a module which enables students to speak with staff in the Financial Aid Office.

Bursar Applications

The four lines utilized by the Bursar are similar to those in the Financial Aid Office and were patterned after the system used in the Office of Admissions and Registrar. The Bursar has five separate modules. The most important module informs students of account information such as current fees and the current balance owed by each student. The system informs students of any financial aid that has been applied to tuition and fees owed by the student. The Bursar's system accepts payment of fees by credit card and has a module that asks students if they want to pay for tuition in that manner. It will accept the credit card's issuing company account number and process credit card transactions in batch form during the evening hours. The system will check for "holds" and inform the student when they exist and which office has placed the "hold." The system also permits other general inquiries, and enables the caller to speak to Bursar staff, if necessary.

Both Financial Aid and the Bursar continue to utilize the VCT series 2000 machine. They have plans to upgrade to a PC-based system as soon as their budgets allow.

Future Applications

To remain competitive and to provide the best service possible to our students, we will continue to enhance the systems we have and bring in new ones as we anticipate student needs. Bulletin board announcements, especially those concerning health-related issues as well as general information for students, are being considered. The health and general information bulletin board system used at the University of South Carolina is exemplary. We may eventually adopt a comparable model.

Out-dialing equipment to supplement the Admissions inquiry system is also under consideration. Student-initiated calls to determine their admission status may be replaced by system calls to the student's home, relaying that information. The main concern we have is whether or not negative connotations associated with computer calling can be overcome. Most people dislike computer-generated telephone calls at home. However, we will continue to explore this possibility.

In addition to telephone applications, revision of our Admissions system to streamline the process recently began. We anticipate having a quick admit screen ready in a few weeks, which will replace six screens used to admit students under our present student records system. This system will eventually be augmented by an imaging system which will enable us to immediately dispose of hard copies of all transcripts, applications, and other supporting documents as soon as they are scanned. The imaging system should provide improved access to documents, rapid processing, and an enhanced system of archiving. It should also enable faculty advisors to easily access their students' files. In anticipation of the new university-wide fiber optic network and to supplement the anticipated imaging system, 36 new PCs are on order to replace the 3270 terminals in our office.

With the addition of finishing touches to a new Degree Audit and Advisement System (DAAS), approximately 80% of the manual degree check processing we currently perform will be eliminated. The DAAS system will be combined with an automated transcript evaluation system and will enable entering transfer students to receive a degree plan outlining all courses transferred and applied toward the intended degree objective, rather than simply an evaluation of credit. Plans are under way to upgrade the two existing 32-line systems from 386 to 486 machines. This goal will be accomplished during 1993.

As you can see by the number of changes we have made and are anticipating making in the future, registration and associated voice response systems are not created in static environments. The evolution of any automated system to a newer, faster, or more efficient environment will continue. If you are prepared to take the first step to automate your systems, be certain you are ready to continue down that path. Once you stop improving your systems, your competitors will pass you faster than you imagined possible, and your students will recognize inferiority when they experience it.

Doctoral Graduation Rates and Time-to-Completion in Ontario Universities: Data and Policies

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Although there has been much discussion and analysis of attrition rates at the postsecondary first degree level in the United States (Tinto 1986) and more limited reference to the issue in Canada (Dietsche 1990; Stewart 1990), only recently has attention been paid to attrition and its converse, graduation rates, at the doctoral level (Bowen and Rudenstine 1991; Gunn and Sanford 1988). This is surprising, for if the concerns arising from high attrition rates at the undergraduate level — the loss of talent, the waste of limited educational resources, income foregone and personal setbacks (Gomme and Gilbert 1984) — are tenable for those pursuing first degrees, these same concerns are even more applicable at the doctoral level. It should be recognized at the outset that nongraduates are not failures. Withdrawal from graduate programs is usually voluntary and influenced by a host of factors, many of which are beyond a student's control. The purpose of this paper is to suggest ways of enhancing the graduate experience in the hope that this will encourage more students to complete their degree.

The Probability of Graduating With a Doctoral Degree

The graduation rate is the proportion of students enrolled in a doctoral program who obtain the degree. There are various methods of estimating the figure (Council of Higher Education 1991), the most useful being a cohort approach (Sheinin 1989). This method involves tracking the progress of students who have newly enrolled in doctoral studies in a particular term in a particular year. Obviously, if a fairly recent intake is selected (for example, students newly enrolled in fall 1987), very few students will have had time to complete their doctoral program. Thus, the term(s)/year(s) selected for a cohort analysis have to be sufficiently distant in time passed to allow time for completion.

Data in Figure 1, from the Corporate Planning and Services Branch of the Ministry of Colleges and Universities, provides information on the proportion of doctoral students who have completed the degree in five annual fall cohorts for the ten universities in the Province that had doctoral programs in the years 1980 to 1984: Carleton University, University of Guelph, McMaster University, University of Ottawa, Queen's University, University of Toronto, University of Waterloo, University of Western Ontario, University of Windsor, and York University. Generally about one-third of all doctoral enrollments are registered at the University of Toronto which includes doctoral enrollments in education at the Ontario Institute for Studies in Education. The proportion of students completing the degree increases significantly after three years (nine terms) but does not increase much at all after eight years (24 terms). The cumulative curves for each of the five cohorts follow roughly the same path, with the graduation rate for the 1980 fall cohort being slightly greater than that for the others. As the 1980 fall cohort apparently presents the maximum proportion of completions, it is this data set that is used in the ensuing analysis.

The cumulative completion curve for the 1980 fall cohort (Figure 2) indicates that 57.34% of the 1,172 students who formally commenced doctoral registration at that time completed the degree in ten years (or 30 terms) or less. It should be noted that 13% decided to withdraw within the first year but after that time the withdrawals are at a much lower rate—about 1% of the cohort total per term. The cumulative completion curve provides three useful parameters:

1. The *graduation rate* (GR) for the fall 1980 cohort,which is the point where the number of additional completions is close to zero, is 57.34%;

2. The *median cohort time to completion* (MCTC) for the entire fall 1980 cohort, which is the time period by which 50% of the cohort has graduated is calculated to be seven years (or 21 terms); and

3. The *median time to completion* (MTC) for those of the fall 1980 cohort who actually graduated, which is the time period within which 50% of those who actually graduated (i.e., the 57.34%) completed the degree, and is estimated to be five years (or 15 terms).

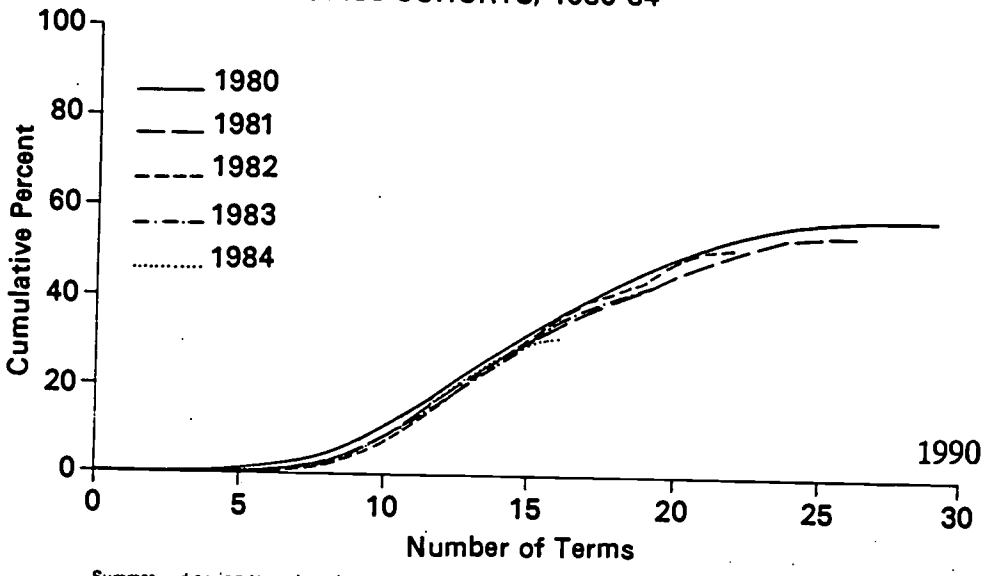
It is the MTC, or related average time to completion, that is usually available (at best) with respect to individual graduate programs, and it is this figure that is used in most "time to completion" studies (CHE 1991). The MTC is, however, a misleading figure because it relates only to those who have actually completed the degree.

It is interesting to note that the MTC estimate of five years for the fall 1980 cohort is similar to data for doctoral students who have graduated from American universities. Before, however, quoting some of the data, it must be emphasized that many U.S. doctoral programs involve either direct entry from the bachelor's degree or an all coursework master's year. Information reported by Thurgood and Weinman (1990) relates to a sample of universities across the United States and refers to the average time to completion of doctoral graduates. In these studies the average time to completion is estimated to be ten years from initial registration in a master's program (includes various types of leaves). If the leaves ("timeouts") are excluded, the average time to completion (including the master's) was a little over seven years. This latter figure is similar to those reported by Nerad and Cerny (1991) who indicate that the average time to completion of the doctoral degree at the University of California, Berkeley, is 6.9 years; and Lockhart and Shih (1993) who estimate that the average is 5.3 years at the University of Florida. As the MTC figure for Ontario is the median, and excludes time spent at the master's level (which is usually 3–6 terms), the estimates are in the same ballpark. It is interesting to note that Tuckman et al. (1990) suggest that the average time to completion in U.S. universities (excluding leaves and "time-outs") of seven years in the 1980s is 1.5 years longer than it was in 1965.

Master's Work

The fairly lengthy aggregate average doctoral time to completion and low graduation rate are compounded in Ontario by the lengthy time to completion observed in a number of disciplines at the master's level. In the course of the appraisal of graduate programs, OCGS has noted that while the graduation rate for master's students tends in most programs to be quite high (75% to 85%), the average time to completion for master's with thesis programs (which predominate particularly in the sciences) is about six terms (Marr and McPherson 1992). Thus,

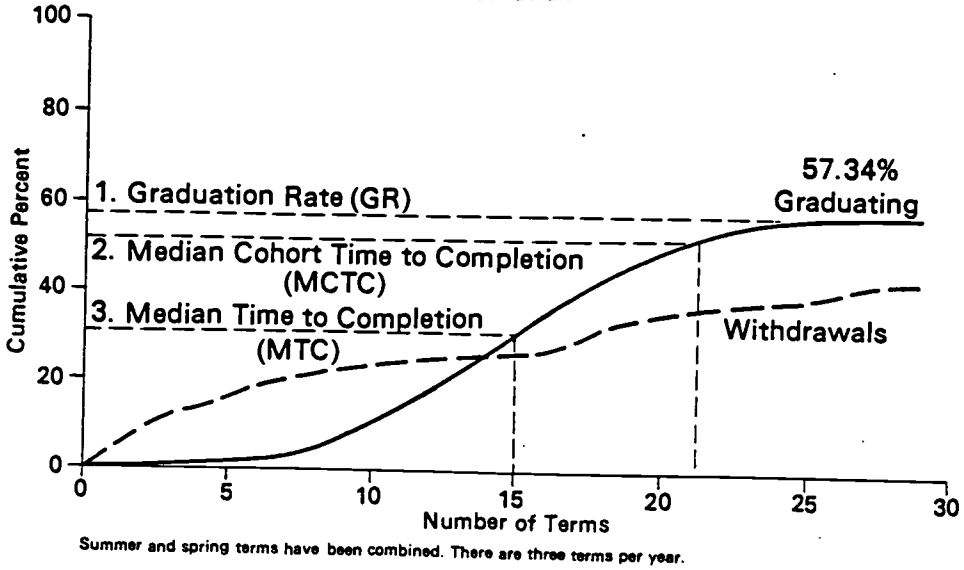
FIGURE 1: FLOW-THROUGH OF PHD COMPLETERS, FALL COHORTS, 1980-84



Summer and spring terms have been combined. There are three terms per year.

FIGURE 2: FLOW-THROUGH OF ONTARIO PHD's FALL 1980

Canadian



Summer and spring terms have been combined. There are three terms per year.

the median time to completion (MTC) from the bachelor's degree (for those who actually complete the doctoral degree) is probably around seven years—five at the doctoral level, and two at the master's level.

Differences in Graduation Rates by Nationality and Gender

An interesting question is whether, in the aggregate, the graduation rates by nationality and gender are different. Figure 3 presents the cumulative proportions of completions for the 1980 fall cohort by (a) gender and (b) visa/non-visa categories. The male graduation rate (59%) is evidently higher than for females (55%), and the MTC is lower (4.7 years and 5.3 years for males and females, respectively). The rates of completion do, however, begin to converge after seven years. The important question relates, however, to the reasons for the differences, in slope between the two cumulative curves. The difference is partially related to the greater concentration of females in the social sciences, humanities, and education, as compared with the higher graduation rates in the sciences in which males predominate.

Differences between the visa/Canadian graduation rates are especially apparent (Figure 3b). Visa students not only have a higher graduation rate (64%) than Canadian students and landed immigrants (56%); they also complete the doctoral degree faster (four years and five years for visa students and Canadians, respectively). These differences may also be due to the disciplinary concentrations of the students—visa students tend to concentrate in science and engineering—as well as the financial and other employment impediments that students with visa status face while they are studying in Canada.

It could also be argued that the higher differential fees for visa students encourage higher graduation rates. Graduate tuition fees for Canadians and landed immigrants are about $2,000 per year, and those for international students about $10,000 per year. Theoretically, the more a person has to pay for something, the greater the desire to gain immediate value from the goods or services purchased and limit further outlays. Conversely, if goods or services are underpriced, too much will be consumed, which in this case is translated into too many years enrolled in a program by those students paying the lower fees. It is interesting to observe that despite the fact that few graduate visa students (if any) pay their own fees and most domestic students receive funding for two or more years, the difference in graduation rates remains.

Differences in Graduation Rates Among Discipline Groups

There are considerable differences in graduation rates among the major discipline groups[1]

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[1]Agriculture and the Biological Sciences includes: animal, plant, soil science; botany; biology; food science and nutrition; veterinary medicine; zoology; toxicology.
Mathematics and Physical Science also include: computer science; chemistry; geology; material science; meteorology; oceanography; physics.
Health Professions include: anatomy; biochemistry; biophysics; pharmacology; physiology; medical toxicology.
Engineering and Applied Sciences include: chemical engineering; civil engineering; electrical engineering; mining engineering; metallurgical engineering; engineering science; forestry; mechanical and aeronautical engineering.
Education/Recreation Studies include: all education including educational psychology and

(Figure 4 and Table 1) with the life science disciplines having almost twice the graduation rate of the humanities. There are also significant differences in the MCTC and MTC parameters among the discipline groups, for example, with the median time to completion of those graduating in mathematics and the physical sciences being 1.66 years less than that in the social sciences and humanities.

Table 1. The Graduation Rate (GR) for the Fall 1980 Cohort in 1990, Median Cohort Time to Completion (MCTC), and Median Time to Completion (MTC) for Doctoral Students by Discipline Group

Discipline Group	GR (percent)	MCTC (in years)	MT (in years	1980-81 Total Enrollment (%)
Agricultural/ Biological Sciences	85.37	4.66	4.33	7
Math/Physical Sciences	74.85	4.66	4.00	14
Health Professions, etc.	72.31	5.33	4.66	6
Engineering & Applied Sciences	60.00	6.00	4.33	8
Education/ Recreation Studies	61.64	6.66	5.33	12
Social Sciences, etc.	49.70	9.33	5.66	30
Humanities	44.91	?	5.66	23
All Disciplines	57.34	7.00	5.00	100

? = Because the GR is less than 50%

The major question, of course, is why do these large differences exist among the discipline groups? There are, perhaps, three basic contrasts that need to be accounted for: 1) between the "sciences" and the humanities/social sciences; 2) "within science" contradiction between engineering and the other sciences; and 3) "within humanities/social science/applied social science" contrast between education and the humanities/social sciences.

The Contrast Between the Sciences and Nonsciences

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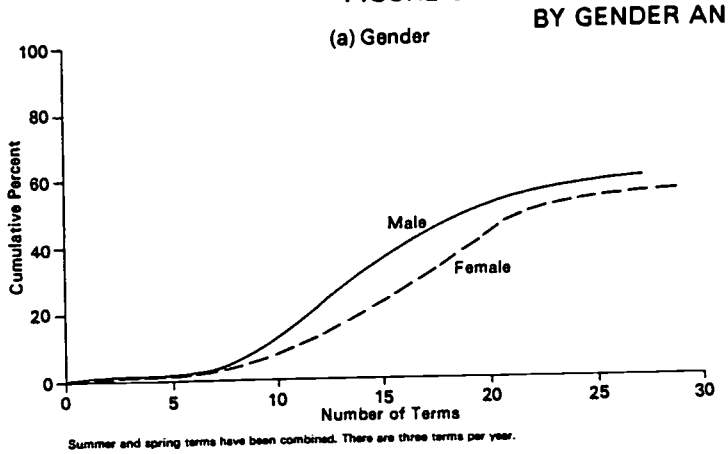
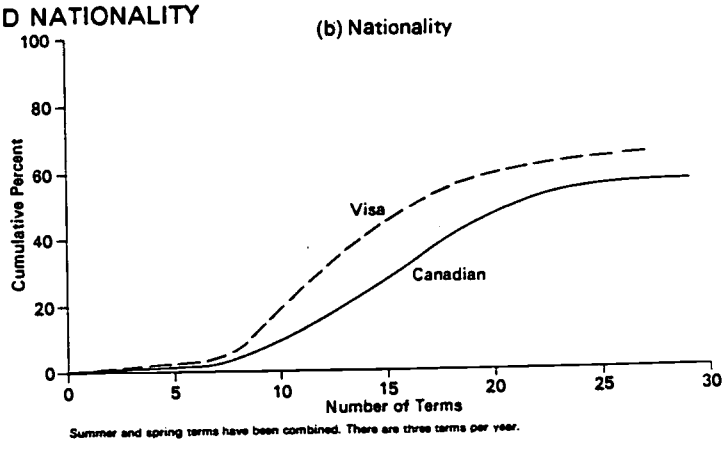
educational sociology; physical education; kinesiology; human kinetics; kinanthropology.
Social Sciences etc. include: anthropology; archaeology; area studies; medieval studies; business administration; planning; environmental studies; political science; law; psychology; sociology; public administration; geography; economics; demography/criminology; family studies.
Humanities include: classics; English; French; languages; library science; linguistics; communication; philosophy; religion; history; journalism; comparative literature, drama and film.

FIGURE 3: FLOW-THROUGH OF ONTARIO PHD's, FALL 1980
BY GENDER AND NATIONALITY

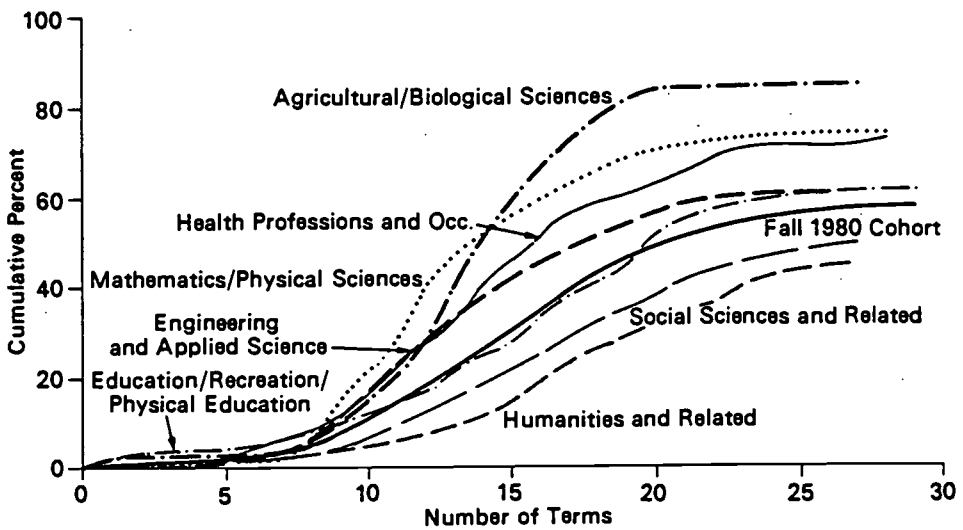


Summer and spring terms have been combined. There are three terms per year.



Summer and spring terms have been combined. There are three terms per year.

FIGURE 4: FLOW-THROUGH OF ONTARIO PHD's, FALL 1980



Summer and spring terms have been combined. There are three terms per year.

Although Nerad and Cerny (1991) list many factors (Table 2) that give rise to different graduation rates and times to completion between the sciences and nonsciences, the major contrast is related to significant differences between the sciences and nonsciences in research ethos, the culture of the dissertation, the availability of research/student support funds, additional skills that may be required, and employment expectations.

1. *Research ethos*: In the sciences a professor's (or supervisor's) career is in part related to the research quality/productivity of the students being supervised. This is because the students "consume" the professor's scarce research funds and university's scarce laboratory space. As the professor has to apply to external agencies for the research funds, and report annually on the use of them, the research has to be seen to progress. Furthermore, at the time of the application for research funds the research of the professor (and therefore his/her co-investigators and assistants) is evaluated with respect to quality and productivity.

   In the social sciences and humanities a professor's career is not related in the same way to the quality and productivity of the students being supervised. In many cases students apply for programs in which there are a number of faculty with experience in a particular topic of interest, and they then (through some matching process) become supervised (or sponsored) by a professor who shares a similar interest and perspective. But, on the whole, the supervisor has his/her own scholarly projects, and the student's work is relatively independent of that.

2. *The Culture of the Dissertation:* The humanities, and to a slightly lesser extent, the social sciences, maintain a view of the dissertation that is different from that in the sciences. They tend to believe that the dissertation should be a major piece of work that is a product of independent scholarship rather than a demonstration of a person's ability to do advanced research in the context of hypothesis testing in a laboratory environment. This view places great demands on the individual student, particularly as he/she is frequently working quite independently.

Table 2. Factors Determining Graduation Rates and Median (or Average) Time to Completion at UC Berkeley

Research Mode	Apprenticeship Mode	Individualistic Learning
	Team Work	Solitariness
	Laboratory	Library
Structure of Program	No M.A./M.S. Required	M.A./M.S. Required
	QE Includes Dissertation Prospectus	QE Does Not Include Dissertation Prospectus
	Annual Evaluation	Sporadic Evaluations
Dissertation Definition	Test of Future Ability to Do Research	Major Contribution to Knowledge (Book)
Advising	Faculty Monitoring	Absence of Faculty
	Departmental Advising	Monitoring and Department Advising
Departmental	Sense of Community	Factions Among Faculty

Climate	Students Treated as Colleagues	Students Treated as Adolescents
Research Money	Many Sources	Few Sources
Type of Financial Support	Research Assistantships Fellowships	Teaching Assistantships Loans Own Earnings
Campus Facilities		
Housing	Affordable	Expensive
Childcare	Available	Overcrowded
Space (Office, Meeting)	Available	Overcrowded
Transportation	Efficient, Affordable	Slow, Expensive
Library	Long Hours/Year Round	Short Summer Hours
Job Market	Many Openings	Few Openings
Post-doc	Well Paid	Medium or Low Salaries
Academic		
Industry	Many Openings	
OUTCOME	**= SHORT TIME LOW ATTRITION**	**= LONG TIME HIGH ATTRITION**

Source: Nerad and Cerny (1991), p. 5.
QE = qualifying exam

3. *Research and Student Supplement Support Funds*: The distinctive science/nonscience research ethos is in large measure related to the difference in availability of research funds and student support funds. The disparity in availability of research funds between researchers in the social sciences/humanities and the sciences is illustrated clearly by information from the main source of funding—the Federal Research and Granting Councils: the Medical Research Council (MRC), the Social Sciences and Humanities Research Council (SSHRC), and the National Sciences and Engineering Research Council (NSERC). Whereas about 60% of all researchers in Canadian universities are in the social sciences and humanities, SSHRC distributes only 12% of total funds distributed by the three Federal councils. Consequently, only a small portion of eligible researchers in the social sciences and humanities (perhaps 4% percent) receive funds from SSHRC. Thus, on the whole, doctoral students in the social sciences and humanities do not receive resources from their supervisors to offset part of their research expenses.

   Similarly, the amount of money available to supplement the living costs of students in the social sciences and humanities is quite restricted. Whereas practically every doctoral student (fulltime or part-time) in the sciences receives some type of living allowance (in the form of scholarship, teaching assistantship, or research assistantship) not every student in the social sciences and humanities receives such support. This is the reason why many students in the social sciences and humanities enroll part-time in their programs after completing their residency (normally two years) requirements. In fact, not only are support stipends for social science and humanities students not as available, the average level of financial support for those students receiving funds is

about one-third that of students in the sciences, and the level of support decreases after four years of study. Thus, students in the social sciences and humanities are, in effect, cut off from living support supplements after their fourth year, which is just the time they need some support in order to devote their energies fulltime to their theses.

4. *Additional Requirements*: It is not unusual for researchers in the social sciences and humanities to have to develop additional skills, particularly in a specific language, that have not been acquired at the undergraduate level. The demands of fieldwork and the need to develop particular linguistic skills consume years of effort in some instances.

5. The drive to complete the degree is also influenced enormously by *future expectations concerning employment.* Doctoral students in the social sciences, and particularly the humanities, have faced a difficult employment situation during much of the 1980s. There have been few jobs available at universities, though this is now improving, and few related to their particular graduate experience in the wider private and public sectors. However, it could be argued that concerns about future employment should not only influence the drive to complete, but also the decision to embark on a program. It has been known (during the 1980s) for some departments in the humanities to warn incoming doctoral students about the bleak employment picture only to find students (perversely) more intent on registration. This determination has not, however, been translated into higher graduation rates!

The generally low (by comparison) graduation rates in the social sciences and humanities have led to calls for the improvement of the "management" of doctoral supervision in disciplines in these areas. Although it is fairly clear what good supervisory practice involves (CGS 1990), such practices are not so easy to implement if other elements of the support environment are not also in place. Successful implementation of good management and supervisory procedures requires the interlinking of a number of performance and support incentives and inducements.

The Contrast Between Engineering and the Other Sciences

While the median time to completion (MTC) for doctoral students in engineering and applied sciences is the same as that for those in the life and physical sciences, the graduation rate is much lower (Table 1). Nearly 30% of the students in engineering appear to withdraw within two years of registration in a doctoral program. Given the high graduation rate in the other disciplines in the sciences, this quite different completion pattern requires some explanation.

The answer probably lies in the particular employment environment for students in engineering in Canada during the 1980s. By the fall of 1982 Canada was emerging from the recession of 1981–82, and North American companies, particularly those in electrical, industrial, and chemical engineering, were offering attractive positions to those with good engineering backgrounds. A number of doctoral students evidently decided to take advantage of the excellent employment opportunities that were available to them. Universities (and NSERC) did, of course, try to encourage students to complete and offered good financial support packages to those who remained enrolled. During the 1980s the support packages for students in engineering were, on the average, three times greater than those available for students in the humanities. But, the difference between the employment salary (and opportunities) and the

doctoral stipend (plus opportunities) was still large enough to cause some students to withdraw.

Humanities/Social Science/Applied Social Science Discipline Comparisons

One matter that requires discussion is the difference between, on the one hand, graduation rates in education and, on the other hand, graduation rates in the social sciences and humanities. The major reason for the difference in graduation rates is related to the types of degree programs that are offered. In education there are two types of doctoral programs, one leading to an Ed.D. (involving 50% of the students) and the other to the Ph.D. The social science and humanities doctoral programs all lead to the Ph.D. (except for a D.S.W. introduced in one university in 1989).

The requirements for the Ed.D. are more flexible than those for the Ph.D. (both generally and in education). The Ed.D. requires a minimum of two terms of fulltime study, whereas a Ph.D. normally requires two years. More importantly, however, the thesis in the Ed.D. may address either "theoretical issues applicable to professional concerns and practice" or "the application of knowledge in order to study, or influence, aspects of educational practice." A Ph.D. thesis, on the other hand, has to be an original contribution to knowledge and an advance or refinement to an important aspect of theory in the area concerned.

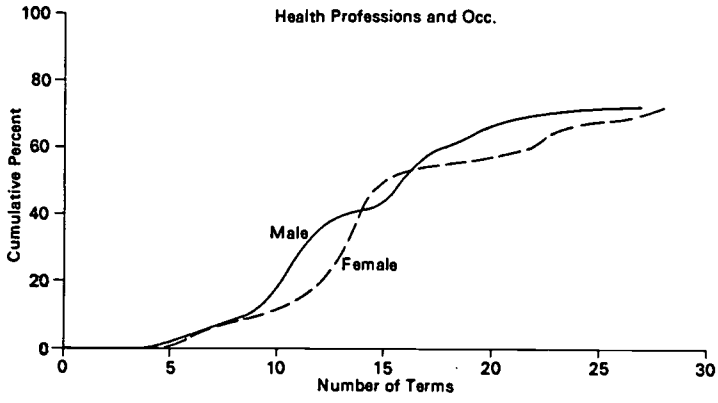
The graduation rate in the social sciences is influenced by the high graduation rate in psychology doctoral programs, which is estimated to be about 70%. As psychology enrollment comprises about 30% of the total doctoral enrollment in the social sciences, it can be estimated that the graduation rate in the other major social science disciplines is similar to that for disciplines in the humanities. The high graduation rate in psychology is related to the fact that the different fields in the discipline have access to a wide variety of sources of research funds (including SSHRC, NSERC, and MRC), the students have access to a similar wide variety of scholarship programs, and an individual cannot apply for registration to be a practicing professional psychologist without completing the doctoral degree. Thus, in psychology high graduation rates reflect good financial support for research, an adequate array of sources for student stipends, and incentives for both the student and supervisor to work hard to complete the degree.

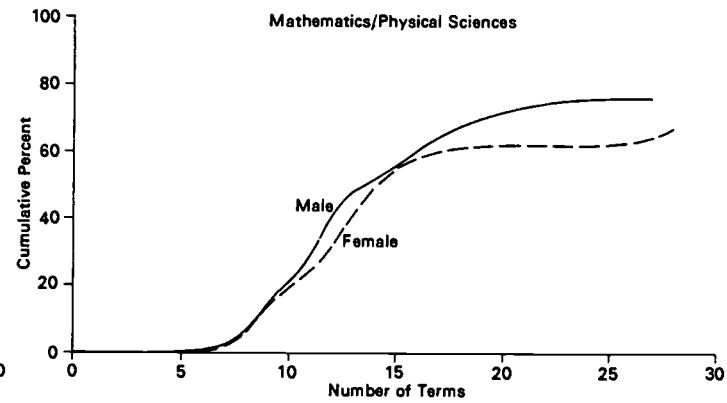
Differences in Graduation Rates Among Discipline Groups by Gender and Nationality

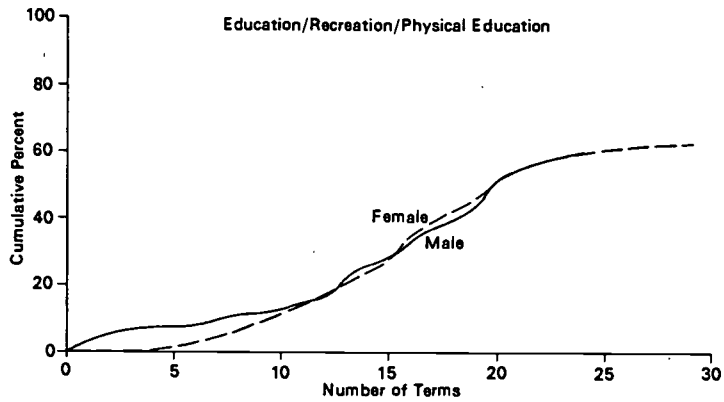
There are some interesting disciplinary nuances in the previously mentioned general differences in graduation rates by gender and nationality (Figures 5 and 6). Graduation rates by gender are available for all groups except engineering and applied science, where the numbers of women graduated is too few, and in the biological sciences, where the numbers of both male and female graduates are too few to provide meaningful comparative information. Although males do seem to have slightly higher graduation rates in the health professions and mathematics and the physical sciences, and the graduation rate for females in the social sciences is higher than that for males, the differences are not large. The graduation rate for both males and females in the humanities is about the same.

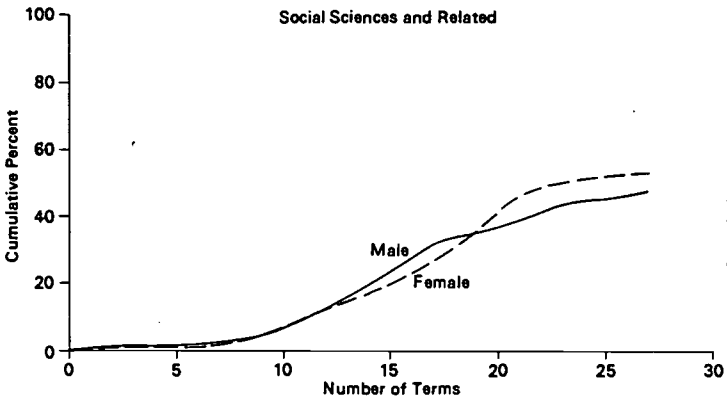
Much greater differences are observed in the graduation rate between visa and Canadian students for those discipline groups in which the number of visa students is sufficient to provide meaningful generalization. The most noticeable difference is in the graduation rates

FIGURE 5: FLOW-THROUGH OF ONTARIO PHD's, FALL 1980









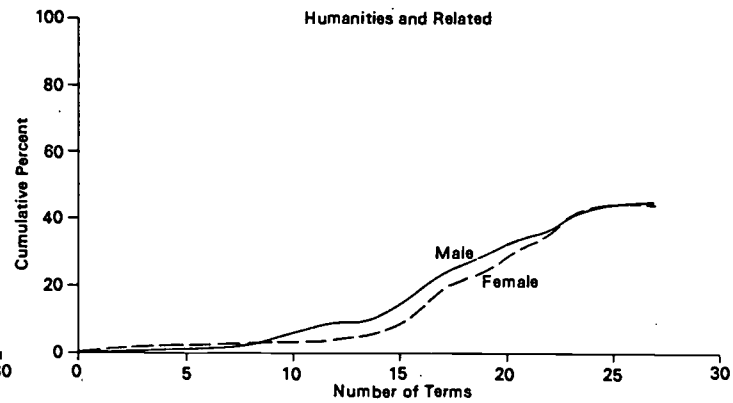
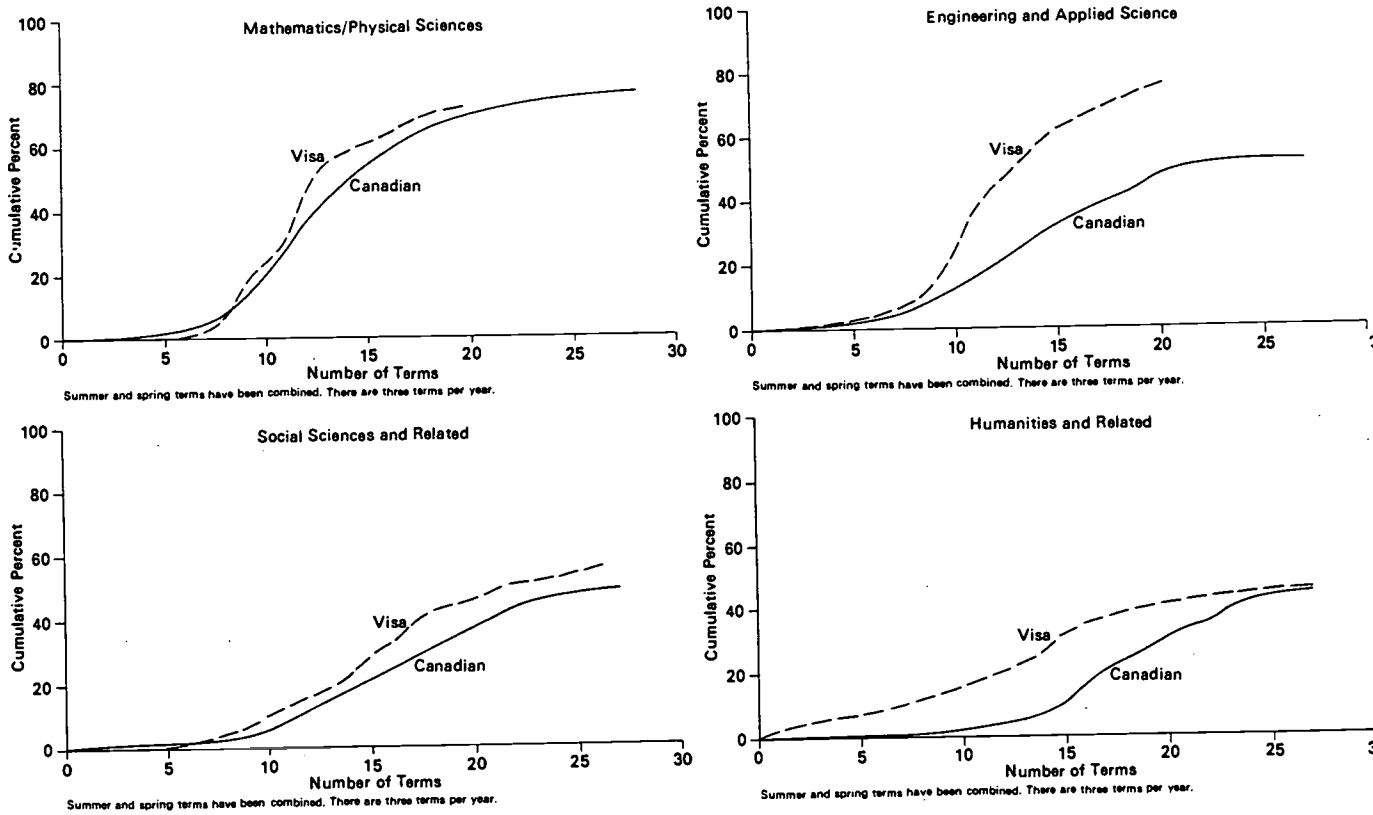


FIGURE 6: FLOW-THROUGH OF ONTARIO PHD's, FALL 1980
BY MAJOR DISCIPLINE GROUP



for engineering and the applied sciences, where visa students account for about 30% of the total doctoral enrollment. In this case, 78% of the visa students graduate in seven years or less, as compared with 52% of Canadians. Furthermore, the MCTC for visa students is four years as compared with seven years for Canadians, and the MTC 3.66 years as compared with nearly five years for Canadians.

International students in engineering and mathematics and the physical sciences do not have the same opportunities as Canadians for regular and summer employment in Canada. There is, therefore, every incentive for foreign students to graduate as fast as possible: financial support stipend packages are available, the supervisors usually generate adequate research funds, if the students do have external scholarships from their own national governments or international agencies these are of limited duration, and they have threat of perhaps having to pay the high differential fees themselves.

Conclusion: Improving the Graduation Rate and Time-to-Completion

Although variations in graduation rates and time-to-completion among the major disciplinary sectors are to be expected, the evidence in this paper suggests that in many programs the graduation rate is far too low and the time-to-completion excessive. The question arises as to what might be done to effect change—which really means change in the way students, supervisors, programs, and universities "behave" with respect to attrition. There is no one quick fix because the entire student support, research funding, faculty reward, and employment environment influence the graduation rate and the time it takes to complete a degree.

This interlocking environment is based on the factors influencing both time and completion identified by Fletcher and Stren (1992), Bowen and Rudenstine (1991), and mentioned in this paper. Perhaps the most important of these are job prospects, financial support, and good supervisory practice. If the job market is good in a particular field, then graduate students will seize the opportunity to graduate and gain a firm position. On the other hand, weak employment prospects lead to much hanging on, procrastination, and the creation of the "professional" graduate student. Fletcher and Stren (1992) emphasize the importance of finances and continuity of registration. If a student has a minimally adequate resource base and does not leave or work part-time for extensive periods to supplement her/his income, graduation rates and time-to-completion improve markedly. Finally, a knowledgeable kind but firm mentor, who keeps the student focused and provides prompt advice, support, and response when needed, is a gem who is valued highly by students but is rarely recognized in salary and promotion evaluations.

The ways of improving graduation rates and time-to-completion are, therefore, quite well known. But as with most concerns in the social public policy arena, the transition from problem identification and policy formation to implementation with respect to practice and regulation is much more difficult. The problem of lowering times-to-completion and increasing graduation rates, particularly in the social sciences and humanities, requires the concerted efforts of administrators, faculty students, and funding agencies. All these constituencies have to be heading in the same direction, for the actions of one group influence the outcomes of the actions implemented by the others.

Glossary

BIU	Basic Income Unit
CAGS	Canadian Association of Graduate Schools
CGS	Council of Graduate Schools (U.S.)
CIDA	Canadian International Development Agency
COHORT	Total number of new students registering at a particular date
COU	Council of Ontario Universities
D.S.W.	Doctor of Social Work
Ed.D.	Doctor of Education
GDP	Gross Domestic Product
GR	Graduation Rate
IDRC	International Development Research Center
M.A.	Master of Arts
MCTC	Median Cohort Time to Completion
MCU	Ministry of Colleges and Universities, Ontario
MRC	Medical Research Council (of Canada)
M.S.	Master of Science (U.S.)
M.Sc.	Master of Science (Canada)
MTC	Median Time to Completion
NGO	Non-Governmental Organization
NSERC	Natural Science and Engineering Research Council (of Canada)
OCGS	Ontario Council on Graduate Studies
OCUA	Ontario Council on University Affairs
OECD	Organization for Economic Cooperation and Development
OGS	Ontario Graduate Scholarship
OSAP	Ontario Student Assistance Program
Ph.D.	Doctor of Philosophy
R & D	Research and Development
RSC	Royal Society of Canada
S of S	Secretary of State (Canada)
SSHRC	Social Science and Humanities Research Council (of Canada)

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Business Process Re-Engineering: Transforming College Admissions

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Re-engineering. What is it? Does it have anything to do with how I do my job, or is this the latest buzz word borrowed from business and retrofitted to higher education? Skepticism may be warranted here, but not before examining some of the problems that occur in admissions.

As a consultant in higher education, my engagements begin with a problem campus executives need explained or solved. Unfortunately, I am brought in to propose solutions and not to identify or understand what happened to create the problem in the first place. The best advice I can remember receiving came from my music teacher. He would say, "First, get it right, then get it fast." This advice may not appear to have anything to do with consulting. However, if you have ever tried to play a difficult sonata on a violin without having mastered the basics of hand shapes, you will get the sonata neither right nor fast. The same principles apply to solving problems; first, you must understand what caused them, then you solve them. This is what business process re-engineering is all about. It is a way of helping organizations work smarter, not just harder.

There are three basic components to re-engineering a process: people, work flow processes, and information management systems.

Many administrative offices in colleges and universities operate compartmentally. Admissions gathers admissions data, financial aid gathers financial data, and alumni affairs gathers alumni data. The problem with this model is that, without well-designed data capture and information flow, information must be recreated so it can be used cross functionally. Why is this a problem? First, errors increase every time information is recreated. Second, the cost of storing information is significant, not to mention the costs to repeat its capture. Moreover, if the data used for institutional planning, budgeting, and positioning is inaccurate, the institution is at risk.

Compartmentalization of information is a direct result of staff not understanding how information is being used. Consequently, they produce only the information they use to do their jobs, without considering who else is using it. Moreover, the goals for which this information is being secured, like stabilized enrollment or increased customer service, are not communicated to staff; thus, their buy-in is not deemed critical to reaching these goals.

The costs of poorly designed data capture and information flow are high. Let me be specific. An institution experiences an unexplained drop in yield. This has happened before. The enrollment fluctuation is creating problems such as underutilization of resources and overcrowding of

facilities. When information systems are queried, it is discovered that they cannot help interpret what is happening, because of their compartmentalized and poorly designed databases. No cross functional interpretation of available information can be extracted. Information that could help interpret yield drops is not being captured. Resolution calls for the implementation of the two most important components of business process re-engineering: processes and information management design.

Often one of the first questions I pose is: "Who opens the mail and answers the phone?" Of course, this is usually not the kind of question administrators expect, and I can tell they are questioning, on the spot, why they are paying consulting fees to someone who asks silly questions. You may be surprised at how much can be learned, however, by trying to answer this question, as this is where flawed "processes" and lack of information flow are most often exposed.

Most requests for information, catalogues, and applications directed to the Admissions Office are received by mail and phone. These initial inquiries are the beginning of your alumni file. This is also where yield data begins and where enrollment fluctuations can be analyzed and corrected. Many schools do not capture data at this stage. Most often the reasons cited are that the volume is too high and data entry too expensive. In some cases this may be true, but only if data capture activities done later in the process are not cost effective when information is ultimately captured. When compartmentalizing functions means information must be recaptured, how can it be more cost effective to capture and duplicate information several times when, with a little investment, information can be captured correctly the first time?

With a properly designed and equipped process, enrollment management could begin at the time of inquiry. Information on applicants could be "appended" to the original student record begun when the application is received. Students who request but do not submit applications could supply useful data to help anticipate any drops in application and yield rates. In addition, information that could be used to market your institution could be captured and used at this point. By organizing data that yields cross functional information, for example, you could analyze the percentage of those students who request materials but choose not to apply. Without a link from the inquiry data to the applicant data, this information is unobtainable. The reasons stated by students who withdrew or did not follow through could be addressed in institutional recruitment pieces. This could increase applicant rates and, subsequently, yield. Withdrawal research would enable you to attract more students by sketching a profile that resembles those who are likely to enroll if admitted.

I often see the scenario in which a decision was made not to capture inquiry data. The name of a student who wrote or called for information is written down, then typed onto a mailing label; then the information that was written down is discarded. If the student calls again, this process is repeated. If the person who does mailing labels is out sick, labels are not produced, and lag time between the initial request for information and the time to receive it is increased. Fulltime staff usually perform this mailing function. Cost of supporting staff, including salaries, benefits, materials, and postage, often with a 20% duplicate postage ratio for second requests, can exceed hundreds of thousands of dollars in operating expenses. Moreover, valuable data that can help anticipate and correct enrollment fluctuations is lost.

There is evidence here that the decision for when data capture begins was not made with the outcome of enrollment management in mind. In other words, it was task driven and not outcome driven. There is nothing wrong with this decision if information is available later in the process and enrollment is stabilized. However, this is usually not the case. The process of information capture needs to be re-assessed and re-engineered as regularly as curriculums are reviewed. The needs of students change and so does the need for information. Processes and systems cannot remain static and remain reliable. Institutions that have been in existence for many years are operating using systems and processes that were developed when they came into being. Even with the installation of new technology and MIS systems, fundamentally, the processes have remained the same.

Recently there has been an increase in interest in business process re-engineering. The primary reason for this is institutions are no longer new users of technology, but are just now beginning to reevaluate how they use technology for enrollment management. This requires a reconceptualization of desired outcomes and the information needed to do this kind of planning. It means rethinking organizational structures, skill sets required to support these new structures, and a new way of doing business. Instead of only being able to compare how one institution's offerings relate to another, institutions must learn how to compete against these offerings. Marketing and institutional positioning must occur, and information on existing and future matriculants must be obtained and analyzed.

Every school I have ever worked for or consulted for has recruitment materials. However, no school could show me the research that resulted in the content of those materials. Marketing research leads to the proper positioning of an institution, but most institutions simply take their last year's number for printing, add 5% for the next year, and produce the same brochures and do the same mailings. This is a process that is somewhat easy to re-engineer. What is difficult is analyzing what is happening, interpreting it, and then distributing the results in the form of targeted recruitment. This re-engineering process can be tied directly to the information cross functional processes discussed earlier. Most Admissions Offices have recruitment budgets, but few have feedback systems on recruitment activities. These feedback systems are important for several reasons. Without feedback, admissions people have no insight into whether or not what they are doing is making a difference. Since I had the privilege of working for a SUNY school as an admissions counselor, I can recount stories of riding around in state cars with bald tires, and no radios. The trunk was piled high with boxes of recruitment materials and lead cards. The problem was, we had no way to track the application activity of those students I met while visiting three high schools each day, followed by a long college night. When I returned to campus, the "orders" for information were filled and the lead cards discarded. Again, valuable information was lost. Moreover, I did not know if what I was doing (driving around the state and talking my head off) was effective. It is hard to build expertise in a profession that gives so little feedback on performance. How would you re-engineer this process?

By linking the inquiry database to the applicant database, those lead cards and the program where they were obtained could be captured. Query ability would enable me to extract at any time the number of students I saw, how many applied, how those from any given program compared with those from other programs and with the overall applicant pool, and whether they were admitted and attended or were admitted and withdrew or were incomplete. This feedback does several

things. It helps me analyze if my recruitment strategy is correct, if I am spending my budgeted recruitment dollars wisely, and if I am making a difference. The simple example of adding feedback on recruitment programs saved me over $15,000 in expenses when I was at the Johnson Graduate School. I discovered I was spending my recruitment dollars recruiting students, 99.9% of whom were refused in the admissions process. Once I knew this, I re-engineered how and where I recruited. I used the money I saved on programs and activities that increased my yield.

Adding this capability to a system is very easy. What is hard is thinking of all the questions you want answered when designing it. You may be asking, "Does this really work?" We re-engineered the admissions process at the Johnson Graduate School. In six years we had the following results: applications increased 66%, yield increased 25%, operating costs dropped $77,000, staff was reduced by 50%, and our national rating for business schools went from 15th to 5th.

Institutions are not used to paying for advice and counsel. This very thought is a paradigm shift. However, the expertise needed to enroll students and manage enrollment usually exceeds the expertise of any one person. Many institutions are looking for consultants with a breadth of experiences who can manage the process of bringing the needed campus experts together and then lend their expertise to campus executives to insure that they have not left out critical areas while creating new processes.

Business process re-engineering is a phrase that may not yet be quite comfortable for institutions to embrace. However, the phrase is not important. What is important is the recognition of what it can do.

Ontario's Colleges of Applied Arts and Technology

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Ontario's Colleges of Applied Arts and Technology, in the "lingua franca" of our province, are called CAATs. The province of Ontario covers a vast territory, stretching along the northern shores of the St. Lawrence River and the Great Lakes from within 100 miles of the Vermont border in the east to within 150 miles of the North Dakota border in the west. Ontario is home to nearly nine million people, or about one-third of the total population of Canada. The government of Ontario substantially funds each of its 17 universities and its 23 CAATs.

While several of Ontario's universities are over 100 years old, the first CAATs opened their doors in 1967. Of the 23 CAATs, one offers programs only in the French language, five offer programs in both French and English, and 17 offer programs only in the English language.

The 23 CAATs have more than 100 campuses, 100,000 fulltime students taking postsecondary certificate and diploma programs, and 500,000 part-time students, mostly over 25 years of age, taking such programs or continuing education courses.

The CAATs were created in the mid-1960s primarily to accommodate the influx of "baby boomers" into postsecondary education. The then Minister of Education said that the CAATs were to serve that part of the population whose needs were not being met by the existing system—e.g, secondary school graduates not destined for universities, adults, and out-of-school youth. The CAATs, therefore, were not designed to be Junior Colleges on the California model, with well articulated freshman and sophomore transfer programs. The CAATs were intended to provide an alternative to the universities for those seeking education beyond secondary school.

The fulltime programs the CAATs have developed during their first 25 years fall into two major categories:

- certificate programs of one or two semesters' duration;
- diploma programs of two or three years' duration, comprising four, five or six semesters of study.

The admission requirements for diploma programs are either the holding of an Ontario Secondary School Diploma (or its equivalent), or the attainment of at least 19 years of age on or before the date of enrollment. Any CAAT may require additional criteria it deems appropriate for a specific program.

The CAATs currently offer more than 300 fulltime diploma programs which cover such diverse fields as:

- Airport Management
- Animation for Television
- Art Conservation
- Environmental Technology
- Land Management for Native Communities
- Manufacturing (Piano)
- Sports Injury Management

Information about all the programs currently offered is included in *Horizons, A Guide to Post Secondary Education in Ontario,* which is published annually by the Ministry of Colleges and Universities.

The policies for admission and for transfer credit for applicants who have completed studies at the CAATs vary from university to university. At the present time the Faculty of Arts and Science at the University of Toronto considers for admission those students who have completed studies at a CAAT with a G.P.A. of at least 3.0, and for transfer credit only those diploma programs which are of five or more semesters duration.

The title "college" is used by many institutions in Ontario which are not CAATs, but which were established before the CAATs. These institutions may be divided into four categories:

- Private Secondary Schools
  - Upper Canada College
  - Havergal College

- Private Postsecondary Institutions
  - Canadian Memorial Chiropractic College
  - theological colleges, of which 13 have restricted degree granting authority

- Colleges Which Are Constituent Parts of Universities
  - University College at the University of Toronto
  - Huron College at the University of Western Ontario

- Professional Regulatory Bodies
  - The College of Nurses of Ontario
  - The Ontario College of Pharmacists

The Ontario College of Art, a four-year postsecondary college for the visual arts, and the Royal Military College at Kingston, one of our three federally funded national military universities, are also examples.

The Government of Ontario has recently established a number of task forces to consider the future development of education in the province and the future role of the CAATs in postsecondary education. While these task forces have stated that they would not wish to see the CAATs forsake their established role for providing alternative postsecondary education to become "feeder" institutions for the universities, they would recommend, among other possibilities:

- the development of greater articulation between appropriate diploma programs at the CAATs and undergraduate degree programs at the universities, and the annual publication of a Transfer Guide, along the lines of those published in Alberta and British Columbia;

- the development of new "advanced training programs" and a College Standards and Accreditation Council to monitor the quality of these programs, some of which may be taught jointly with the universities and may result in a new degree—tentatively called a Bachelor of Technology—which could be conferred either by the universities or by a new organization to be established by the Government of Ontario, similar to the Council for National Academic Awards in the United Kingdom.

These are, at this stage, recommendations which may or may not be implemented. The role of the CAATs will continue to evolve to meet the changing needs of the students of Ontario.

Defining Enrollment Planning: A Nuts and Bolts Approach

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Overview of Enrollment Planning

Much of what I have to say in this article has been derived directly from the professional tutoring I received working directly for James G. Pappas, Dean of Academic Services at Central Washington University. His "nuts and bolts" approach to enrollment planning was not only written and talked about on paper, but implemented and assessed at both Chicago State University and Central Washington University. For the last 17 years, I have had the pleasure of working in an environment that supported the concepts of enrollment planning.

Institutions of higher education can no longer afford to ignore the fact that there is a very strong possibility that the bottom will fall out on them. Both public and private universities are becoming increasingly aware of the need to adequately plan and assess their enrollment-related activities.

The stable position higher education has enjoyed over the years has been drastically altered by the various economic conditions evolving daily in the United States and the world in which we live. This is especially true for the state-supported public institutions that, until recently, had practices allowing enrollment to grow as the enrollment practices remained stable and, in many cases, did not assess their various activities associated with an enrollment process.

Thus, a number of universities have never had to fully address all of the issues associated with enrollment planning. Many postsecondary institutions interpreted the concept of enrollment planning to mean only becoming more aggressive in marketing and recruiting rather than readdressing the theory to adequately review and modify their program offering so that programs were actually *marketing themselves* to all of their publics.

The current economic conditions that have again forced top university executives to strategically plan for the years ahead have reinforced the need to effectively manage enrollment. Many now realize they can't count on past practices to guide them to the future. Because of this, more and more institutions are becoming increasingly interested in total enrollment planning. These institutions are making specific efforts to enroll the right kind of new student, to have the right kind of balances between freshmen, upper-division and lower-division transfers, a balance between undergrads and grads, and a balance of males to females to fill all of their campuses' programs.

The evolution of enrollment planning in the 90s has seen increasing efforts being made by academia to increase or maintain a pluralistic student body. Attempts are being made to attract underrepresented students to the campuses and enhance various student services that must be

adjusted to provide mentorships, peer counseling and intrusive advising so that special segments of any campus population have the opportunity to succeed.

Many campuses are readdressing the financial aid process so that students receive timely and properly proportioned financial aid or scholarships based on the overall enrollment plan of each institution. Efforts are being made by institutions to properly house, academically advise and place students in major or major-related course offerings, based on each student's ability level. In addition, campuses are readdressing the delivery of their services so that students can preregister in a timely fashion, receive hands-on instruction, graduate and, in most cases, be placed in careers based on their total educational experience. Campuses are beginning to accept that students in attendance must receive opportunities for an adequate variety of extracurricular and intramural activities that contribute to the total college experience. Most institutions are repositioning themselves to serve this need. Campuses are also reevaluating the various intervention processes that must be in place to help foster students through the educational experience.

Those that have adopted enrollment planning have moved away from the "body for a dollar" approach to managing enrollment. Universities have come to realize that enrollment planning is the ongoing process that evaluates, assesses and makes appropriate changes to everything that happens with students from the preenrollment stages to beyond graduation. Those that adopted it realize it is not just a set of formulas, policies, numbers, or outcomes, but a continuous process.

Institutions that have taken on a "nuts and bolts" approach to enrollment planning know and understand the following:

* What marketing is
* What the institutional challenges are
* Who is involved in the process
* What the vision is for the institution

Through marketing, institutions know what programs are strong and what programs need to be strengthened. This process of review dictates what steps need to be in place to adequately serve those wishing the educational experience. Kotler and Fox highlight this in their book, *Strategic Marketing for Educational Institutions.*

Universities utilizing professional marketing techniques adopt and develop advertising tools that assist them in providing information to their various market segments. Professional marketing techniques help the university communicate programs to the public and ensure that information on academic programs is distributed to the media, high schools and community colleges associated with the university.

By identifying the challenges ahead, colleges and universities can stay competitive. This allows colleges and universities to plan for curricular or program changes, to stay even with their competition, to work within budget controls or limitations, and to improve the quality of a pluralistic student body. Institutions can prioritize marketing-related activities for recruitment and retention, and develop action plans based on relevant data to meet enrollment projections.

By identifying who is involved, universities can develop an enrollment planning system that mandates effective and efficient utilization of services from a cross section of the campus community involved with the entire process. The growth of working interrelationships among segments of the campus leads to the growing success of a true campus-wide enrollment plan. By identifying the vision for the campus, the university can collectively work to reach enrollment-related goals. Typically, this is dictated by the campus' strategic planning process. Campuses that understand enrollment planning will come to understand that the curriculum, the institutional image, recruitment of students, quality of the faculty, quality of instruction and the various retention efforts, as well as the intervention processes that are put into place by an enrollment plan, are all interdependent of this process.

How to Begin

Those responsible for enrollment planning must have the management science capability to assess all efforts related to this process. Enrollment planners must identify responsible people from the other campus areas who need to interrelate as a support group to support this process. Key people from faculty, administration, staff and from the student body must be involved so that each campus can adequately address issues relating to enrollment concerns, develop plans to be implemented and, most importantly, implement the plans. From within this group, key people have to be identified who will provide the motivation and leadership to move the campus.

Institutions must also make people responsible for developing, implementing and evaluating marketing plans based on the overall enrollment plan. Again, a management science background is extremely useful to those assessing these tasks.

Enrollment planners must continuously identify the "hot" items to be addressed in the enrollment planning process. Enrollment processes, academic program offerings, retention efforts and placement activities are all samples of activities that need to be focused upon in this effort. The enrollment planner must routinely prioritize the key issues and problems for all involved, as this is an endless process. Most importantly, those involved with the "how to" of enrollment planning need to communicate to everyone what is being discussed, what modifications to the process are taking place and what is happening within the process.

Specific Actions

Campuses have to also identify specific actions that must take place in an enrollment planning process. Highlighted below are a number of specific actions that, when implemented, are the "nuts and bolts" behind an enrollment planning process.

First, institutions must evaluate and outline the cost benefits for and the efficiency with which they presently do business. Institutions involved with enrollment planning know where their applicant pools come from geographically; they understand yield rates; and they know which programs are strong and which ones attract the largest number of students.

Secondly, institutions involved with enrollment planning must continue to identify their strengths. They must know how their facilities, tuition and fees, housing costs, programs and faculty are viewed by their publics by researching these issues. Institutions must also evaluate how extracurricular activities and events affect their position within each market.

Third, institutions must review their *perceived* image vs. the *real* image. Campuses must know the difference between what they (faculty and staff) perceive their institution to be and what the public perceives their institution to be. This can be accomplished by completing a number of the tasks listed below:

1. Survey the students who were accepted but did not enroll.
2. Survey the students who were accepted and enrolled, i.e., first year fall students.
3. Survey main feeder school contacts, such as high school counselors and teachers.
4. Conduct focus group interviews so as to learn how the institution is described and identified by students, faculty, staff, alumni, high school and community college counselors, policy makers, etc. This is something accomplished simply by better communicating with the publics each institution serves.

Fourth, institutions must know where their students come from. This is the area of *marketing research* that can be accomplished by completing the following charges:

1. Compile information that shows where students live (by zip code). This should be listed by applicants, accepted students and enrolled students.
2. Study the demographics separately of freshman and transfer students. Know where students are from (geographically), their high schools, majors, age groups, etc.
3. Share enrollment-related analysis with deans, faculty and support staff and highlight significant points and areas of emphasis found from this research.

Fifth, know which academic programs draw students. This is *marketing*.

1. Develop demand yields of applicants to each major so as to pinpoint the various major trends for each college.
2. Analyze the applicant pool to see if demand is based on factors pertaining to geography, ethnicity, etc.
3. Consistently forward various studies to the university administration and faculty. The campuses must know and acknowledge the programs that are in high or low demand, and work collectively to capitalize on the strengths of the university.

Sixth, institutions must strive for quality of new students. This is the admissions and academic standards area. Admission standards must be adjusted or modified to focus on the *long range* outcome. Institutions need to understand what types of students are attracted and what standards are appropriate for the students enrolling, not just applying, to the university. Campuses need to examine the objective/subjective decisions made in the admission process, and implement policies and procedures to ensure that integrity, compliance and ethics are not compromised. Institutions must validate the selection process against success rates of enrolled students. Again,

this feedback needs to be provided to the campus community in an ongoing cycle.

Seventh, universities need to assess the quality of continuing students. The institution must look at *registration, records and academic standards* and see that policies and procedures are discussed and implemented. This can be accomplished by completing the following tasks:

1. Review academic standards.
   a. The withdrawal policy from the university.
   b. The withdrawal policy from individual classes.
   c. Incomplete, pass/fail, credit/no credit, grading policies.
   d. Repeat policy.

2. Review preregistration and open registration policies.

   a. Who registers first, freshmen or seniors?
   b. Should on-site phone registration be used?
   c. On-demand registration.
   d. When do transfer credit evaluations take place? Are students accepted first, or are evaluations done for any prospective student?
   e. Transfer evaluation policies.
   f. Articulation policies.

3. Review graduation requirements; this involves academic standards.

   a. GPA requirements for graduation.
   b. Senior project.
   c. General Education requirements: are there many choices, or is the program prescriptive?
   d. Academic residency requirements - numbers of quarters on campus prior to graduation.
   e. Limits to number of C/NC and pass/fail grades in General Education and major.

Eighth, institutions must develop enrollment models based on the institution's strategic plan. An enrollment forecasting tool must be developed and must consist of the following:

1. Students presently enrolled (attrition rates, retention rates, graduation rates).
2. New students entering (predicted yields).
3. Guesstimates for specific numbers desired.

Numbers should be predicted for years in advance with the model focusing on the various strengths of the applicant pools.

Ninth, institutions must implement retention strategies and academic intervention policies. Incorporated in these policies should be the following:

1. Advisement of majors.
2. Intrusive advising for students with deficiencies in math or English.
3. Peer counseling.
4. Mentor program.
5. Probation counseling.

Tenth, institutions must look at the placement records of graduates to ascertain what percent are being placed in areas or careers emphasized by their educational experience.

In order to be successful, an enrollment planner realizes that a proactive university must clearly define its goals and work to build total institutional support for their attainment. By carrying out the specific acts highlighted above, one will be able to accomplish this. Although the tasks are endless, those associated with enrollment planning come to realize that the best made plans, if only talked about rather than implemented or assessed, are of no merit to anyone.

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Developing a Computerized Multicampus Transfer Information System

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Introduction

Increasing numbers of colleges and universities throughout the country are recognizing the importance of transfer students and the need to improve the transfer process. In December 1986, the University of Wisconsin System Board of Regents published a report entitled "Planning the Future: Report on the Future of The University of Wisconsin System." Several resolutions in the report focused on improving transfer into and between University of Wisconsin System (UNW) institutions. One resolution called for the establishment of a computerized credit transfer system that would become the official course equivalency and degree requirement table for the University of Wisconsin System. The Wisconsin State Legislature approved funding for this project with the stipulation that the Wisconsin Vocational, Technical, and Adult Education System (VTAE) be incorporated into the system. This paper describes what the system is, how it works, and the process that was used to develop, design, and implement it.

Background

The University of Wisconsin System (UWS) is a public multicampus educational enterprise consisting of 13 four-year institutions, 13 two-year centers and a statewide extension program with a systemwide enrollment of approximately 157,000 students. Each four-year institution has its own course catalog and numbering scheme. The two-year centers use a common catalog with common course numbers. Last year over 13,000 students transferred into or within the system. Intrasystem transfers accounted for about one-half of this total. Although the two-year centers accounted for approximately one-third of the intrasystem transfers, there were more transfers between the four-year institutions than from the two-year centers into the four-year institutions.

The VTAE System is a public multicampus enterprise consisting of 16 technical colleges enrolling more than 121,000 students in associate degree and vocational diploma programs. The main mission of the VTAE System is to prepare people for the workplace. Three of these institutions have statutory authority to offer college parallel courses in addition to their technical curriculum. Last year just over 1,550 VTAE System students transferred into the UWS, primarily from the college parallel institutions.

Funding

The transfer information project included funding for three fulltime professional staff at the UWS

central office. The positions consisted of 1) a project administrator primarily responsible for project development and planning, transfer policy coordination, and budgetary supervision; 2) a project coordinator primarily responsible for coordinating and maintaining the data and for developing and conducting training programs; and 3) a technical coordinator primarily responsible for developing the system design and program software and for coordinating the hardware purchases and installation. Additional part-time programming staff also was used.

Funding also included provision for computer hardware and software. These funds will be used to provide the UWS central office with a processor to store and process the central database and UWS institutions with workstations to access the Transfer Information System and to maintain the system. Funding did not include provision for increased staff support at the institutions.

Current Transfer Policy

In December 1989 the Board of Regents approved a revision of the UWS Undergraduate Transfer Policy in an effort to improve the transfer process within the UWS. The new policy called for a "spirit of accommodation" for transfer students such that maximum recognition would be given to courses satisfactorily completed in applying toward requirements at the receiving institution. Transfer students were to be treated similarly to nontransfer students in determining degree requirements, registration priority, and admission to majors and programs.

In addition, the new transfer policy required that transfer information be made readily available to students and that UWS institutions publicize changes in admission and degree requirements well before implementation. The computerized transfer system was envisioned as a key resource for communicating transfer information and changes in admission and degree requirements to students and staff.

Credit transfer policies between the UWS and VTAE System have also changed significantly in the past few years. The most recent agreement permits transfer of up to fifteen credits of VTAE non-college parallel general education courses into UWS institutions. The policy also encourages the development of program-to-program articulation agreements that may include transfer of additional noncollege parallel courses. As a result of these changes, the number of transfers from the VTAE System increased steadily over the last few years.

Project Description

The Transfer Information System (TIS) provides students and staff with accurate, current, and accessible information to help students make decisions that will enable them to transfer into and between UWS institutions and complete their degree programs without unnecessary delay. It is a comprehensive means of organizing and disseminating information that can be used to improve the transfer process.

The project is divided into phases and will be implemented progressively, beginning with pilot sites and gradually expanding to the other institutions in the UWS and VTAE System. It is conceivable that state high schools may eventually obtain access and that other colleges and

universities may be included in the system.

The four project phases are as follows:

Phase 1: Courses and Transfer Equivalencies

A. A course equivalency matrix matching UW Centers and VTAE System college parallel courses with the equivalent courses at UWS institutions.

B. An expansion of the course equivalency matrix to include the matching of lower level (freshman/sophomore) courses at all UWS institutions and other transferable courses at the VTAE System institutions.

C. An enhancement of the equivalency matrix to include descriptions, credits, and prerequisites, and breadth and level designations for all courses, as well as equivalencies for selected upper level courses.

Phase 2: Institutional Information

A. A reference menu containing information about all UWS and VTAE System institutions including institutional descriptions, admission requirements, transfer procedures, financial aid, and campus housing.

B. A catalog of majors, minors, and preprofessional/professional and degree programs at each UWS institution and associate degree programs at VTAE System institutions.

Phase 3: Academic Program Requirements

A. A comprehensive listing of general education, major, minor, preprofessional/ professional, and other degree requirements at each UWS institution and requirements from selected associate degree programs at the VTAE System institutions.

B. A summary of recommended courses that will best prepare a student for transfer into selected academic programs at a given UWS institution.

Phase 4: Transfer Progress Reviews

A. A personalized evaluation indicating how an individual student's academic record and/or proposed list of courses applies toward completion of any degree program at any UWS institution.

Technical Background

The computing center for the UWS central office provides a wide range of services that includes applications for areas such as facilities, risk management, payroll and staff benefits, accounting, student financial aid, and curricular and student data. The center is supported by an IBM 4381

running DOS/VSE under VM. Systems are predominantly written in COBOL and Natural in an ADABAS database environment.

Each four-year institution in the UWS has its own computing center with applications including individual student record systems. The technical environment at the institutions varies greatly with mainframes, minicomputers, and local area networks (LANs) from vendors such as IBM, UNISYS, DEC, and others. Similarly, the VTAE System institutions have diverse technical environments and applications. The two-year centers have LANs that are linked by a wide area network called CentersNet.

In 1990 the National Science Foundation awarded a grant to a consortium of UWS institutions and Wisconsin private colleges to develop WiscNet, a statewide telecommunications network to be used primarily for academic applications. It is anticipated that the network will be expanded to include VTAE System institutions.

Technical Design

When development of TIS began in 1988, no systemwide or statewide data network existed that could provide inexpensive communications between and among the UWS and VTAE System institutions. Without such a network to link the institutions, it was decided that the first phase of TIS would be developed as a microbased system on stand-alone microcomputers or on microcomputers linked in a LAN. This design provided a consistent hardware configuration for the institutions, which could be installed in a relatively short time. It also permitted the use of software that was ideal for developing user-friendly prototypes. Data were gathered centrally and distributed for storage and processing on the microcomputers.

With the arrival of WiscNet, new design options for TIS that made better use of existing hardware, networks, and other campus resources became possible. A technical working group was formed in 1990 to suggest new design alternatives for TIS. Among its recommendations, the working group suggested that all data and processing for the first three project phases be centralized at a central computing center with WiscNet used to access and maintain the information. In the future, institutions could be provided with the option to decentralize portions or phases of TIS, storing and/or processing the data at their campus computing centers. Because most institutions have or will have a degree audit system, the working group further recommended that the final project phase (Transfer Progress Reviews) be totally decentralized with access provided to transfer students through TIS.

As a result of the working group recommendations and technological advances such as WiscNet, a conversion of the current system from a microcomputer to a mainframe system is being investigated. The TIS project staff developed an automated maintenance process on the mainframe for course and transfer equivalency data. If the mainframe system works well for maintenance, conversion of the current system will follow.

Gopher software developed at the University of Minnesota is now being investigated as the means to implement Phase 2 (Institutional Information) and Phase 3 (Academic Program Requirements) of TIS. Gopher is a distributed document delivery system. It allows a user to access documents residing on various Internet host computers by following a series of menus. Information in Phases 2 and 3 of TIS is predominately textual in content, and Gopher provides a ready made delivery system for it. For TIS, each UWS institution will have its own Gopher server, thus distributing the preparation, storage, and delivery of the information to the owners of the information.

Hardware and Software

The microcomputer version of TIS was developed using Paradox, a relational database, which runs on IBM compatible microcomputers under DOS. It operates on stand-alone microcomputers or in a LAN environment and can be installed on Novell and Starlan networks.

The TIS software program is menu driven, requiring minimal user keying, and includes a highlighting selection procedure. It is written for either a color or monochrome monitor. It is designed so that first-time users can operate the system with little, if any, outside assistance. Users can view requested information on the screen and can print the information on a local printer. (Refer to Appendix I for sample screens and reports.)

The on-line course and transfer equivalency maintenance system was developed on the IBM 4381 mainframe computer. It is written in Natural in an ADABAS database environment. Staff at UWS institutions access this system across WiscNet using TCP/IP Telnet software. The next step in this process is to move TIS from the IBM mainframe to a smaller UNIX computer. This move, also known in the computer industry as "rightsizing," is designed to address issues such as providing better telecommunication capability, improved performance, and reduced computing costs.

Data Collection and Maintenance

Course and transfer equivalency data required for TIS Phase 1 (Courses and Transfer Equivalencies) are currently collected via magnetic tape submissions three times each year. The central course database is updated from the course submissions and reports are sent to each institution indicating the number and nature of the updates. The institutions reevaluate their course equivalencies based upon these updates and send any updated equivalencies to the central office in the subsequent equivalency submission.

An automated on-line process will soon be implemented that will permit urgent updates to both the course and transfer equivalency databases. A pilot of the on-line system for equivalency updates was completed recently. With this system, authorized staff at any UWS will access the central database via WiscNet. Although they will be able to view all institutional data, they can update only their institution's data. The on-line system is designed for easy user access. It includes many user-friendly elements associated with personal computer software such as pop-up windows, scrolling lists, an action bar with pull-down menus, cursor-sensitive screen displays, and extensive on-line help. (Refer to Appendix II for sample screens.)

Project Development, Implementation, and Evaluation

Advisory Groups

From the outset, it was determined that the design, development, and implementation of TIS would be a collaborative process involving all UWS institutions and the VTAE System. To accomplish this, three advisory groups were established.

The TIS Advisory Committee was created to help the project staff define procedures and guidelines for the project and to recommend solutions to issues that dealt with system or campus policy as they related to TIS. The group is composed of staff, faculty, and students, with one representative from each UWS institution and a representative from the VTAE System. For the first two years of the project, the group met about five times a year. Now, the group meets twice a year with additional teleconference meetings as needed.

Another group was established to help define how TIS would be implemented in the VTAE System and how VTAE System data would be represented, collected, and maintained. This group is composed of VTAE system representatives from those areas that are or will be involved with TIS (e.g., admissions, student records, academic affairs, and computer centers). This group meets with the same frequency as the TIS Advisory Committee.

Each UWS institution was also asked to designate an individual to serve as a liaison to the project to coordinate its implementation at the institution. The TIS liaisons are called upon as needed to develop or review recommendations on such matters as training procedures, equipment installation, data gathering, and maintenance. A similar group is presently being formed in the VTAE System.

Design Strategies

As indicated earlier, the project is being implemented in phases. The design process used by the TIS project staff is essentially structured analysis. The staff begins the process by developing a model for the phase, including sample screens created in a word processing format and data flow diagrams. The data flow diagrams are developed to identify and define appropriate relationships between required data, data sources, and data delivery. This model is shared and refined with pilot institutions selected for the particular phase. Terms used in the model are defined and debated in an effort to develop commonality and consistency among the institutions. The model is then shared with the TIS advisory groups to insure that all institutions are comfortable with the general direction of the project phase.

This model becomes the initial design used by the programmer to develop computer prototypes. The prototypes are shared and refined with the pilot institutions in preparation for the pilot study.

Pilot Studies

Three or four institutions within the UWS and VTAE System are selected as pilot sites for each project phase. Besides assisting with the development of the model, the pilot sites conduct a test of the prototype system at their institution. In the initial Phase 1 pilot, approximately 100 students and 25 staff at each pilot institution were asked to use the system and complete evaluation forms. These evaluations formed the basis of the final report written by each pilot institution and led to final modifications of the prototype system. After these modifications were made, the system was reviewed by all institutions for final approval prior to implementation.

Implementation

In order to implement and maintain TIS, each institution is asked to establish a campus coordination team. This team, headed by the TIS liaison, administers the project and provides necessary project support. The responsibilities of the team include the following:

- collection and submission of TIS evaluation reports
- coordination of campus staff training
- coordination of data gathering, formatting, and maintenance
- development of a campus TIS implementation plan
- establishment of communication linkages to support TIS
- verification of TIS institutional data
- integration of TIS into institutional computing systems
- maintenance of TIS hardware and software
- troubleshooting of TIS hardware and software problems.

Typically, coordination team members are drawn from those areas that have the most involvement with TIS. These areas include admissions, student records, academic advising, and the computer center. Some campuses have included members of the faculty or academic administration on the team to address any issues that may affect institutional policy. The TIS project staff works with the coordination team in implementing the system at each campus. The staff conducts training sessions, assists with hardware and software installation, and provides ongoing support.

Evaluation

User evaluation of TIS is built into the system. After completing TIS sessions, users are asked to answer a few questions about their experience with the system. The questions attempt to determine whether the user found TIS easy to use and operate, and if the information they obtained was helpful. Also built into the system is a means to count the number and type of users (students, faculty/staff) by institution and the functions that they use. This information will be used to determine future directions for TIS.

Current Status

The initial phase of TIS is currently operational in the two-year centers. Conversion of the microbased system will begin this spring. It is anticipated that all UWS institutions will be operational in fall 1993. Implementation in the VTAE System will begin in spring 1994. Meanwhile, additional data are being collected to enhance the transfer equivalency database and to support the remaining TIS project phases.

The pilot institutions for the second project phase have been selected. A model for this phase is nearing completion, and a pilot study, which will test the new Gopher delivery system, is planned for fall 1993 with implementation scheduled for the following spring. It is anticipated that the project, as a whole, will be completed in 1996.

Benefits

Transfer students and transfer advising staff should realize significant benefits from TIS. Accurate and accessible information will help students with course and transfer decisions, enabling them to transfer into and between UWS institutions and complete their degree programs without unnecessary delay. TIS also will provide staff with an efficient and effective system to communicate course, major, degree, and other program changes within all UWS and VTAE System institutions.

Appendix I

Appendix I provides a sample of screens and reports that are included in the student version of TIS. The following is a list and description of the screens and reports:

Screen 1—Welcome Screen

This is the initial screen for the Transfer Information System.

Screen 2—Main Menu

This screen lists and describes the various options that will be available in the Transfer Information System. It also illustrates the cursor-sensitive TIS "Help" function.

Screen 3—Course List

This screen provides the user with a list of the selected courses that will be used for accessing course equivalencies.

Screen 4—Course Equivalencies

This screen provides the user with equivalency data based upon input of several parameters, including the sending and receiving institutions, courses taken or to be taken, and year/term taken.

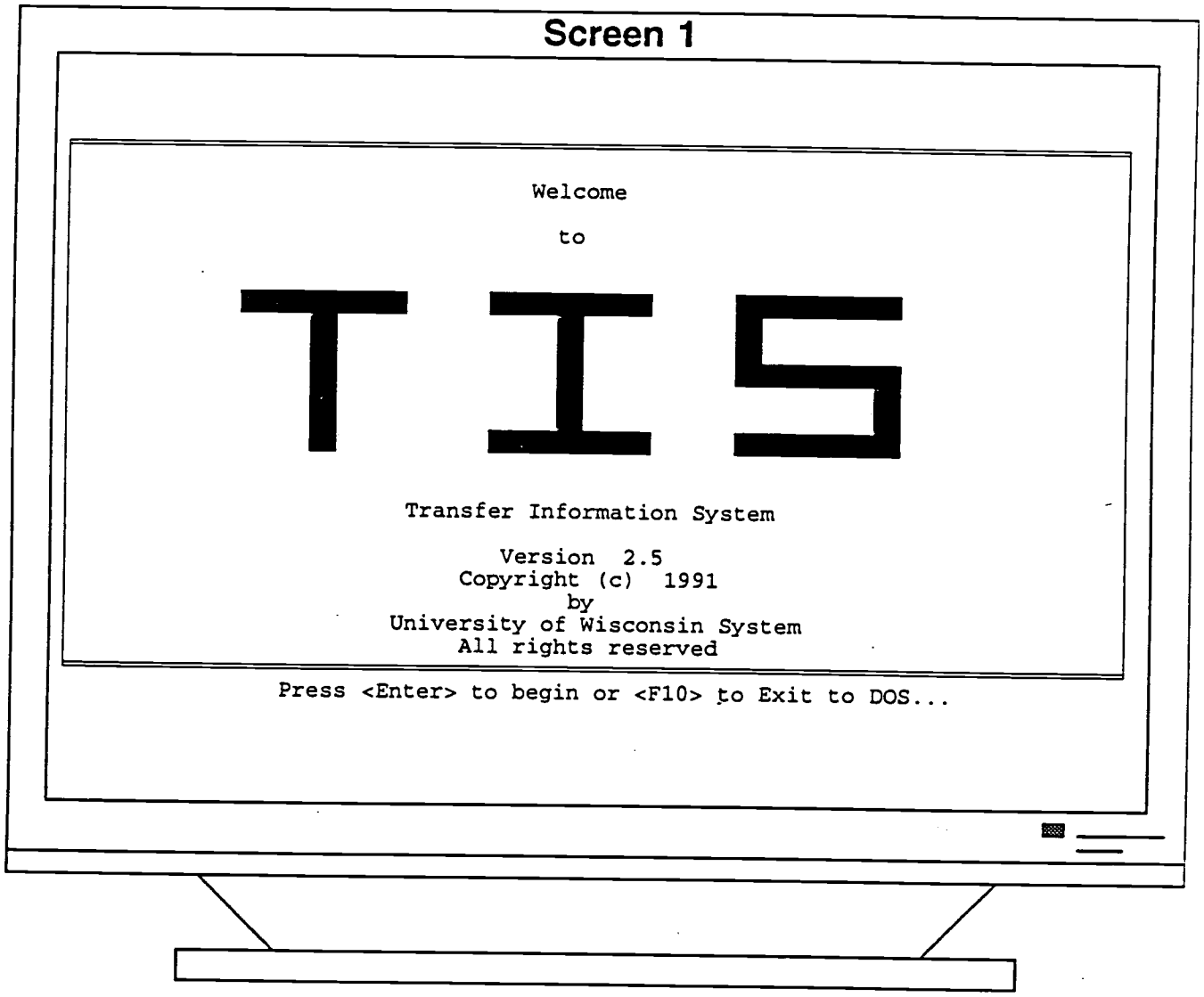
Screen 5—Specific Course Equivalency Information

This screen provides the user with more detailed information about the course equivalencies, including credits and course level granted by the receiving institution, general education requirements met, and special circumstances related to the specific course equivalency.

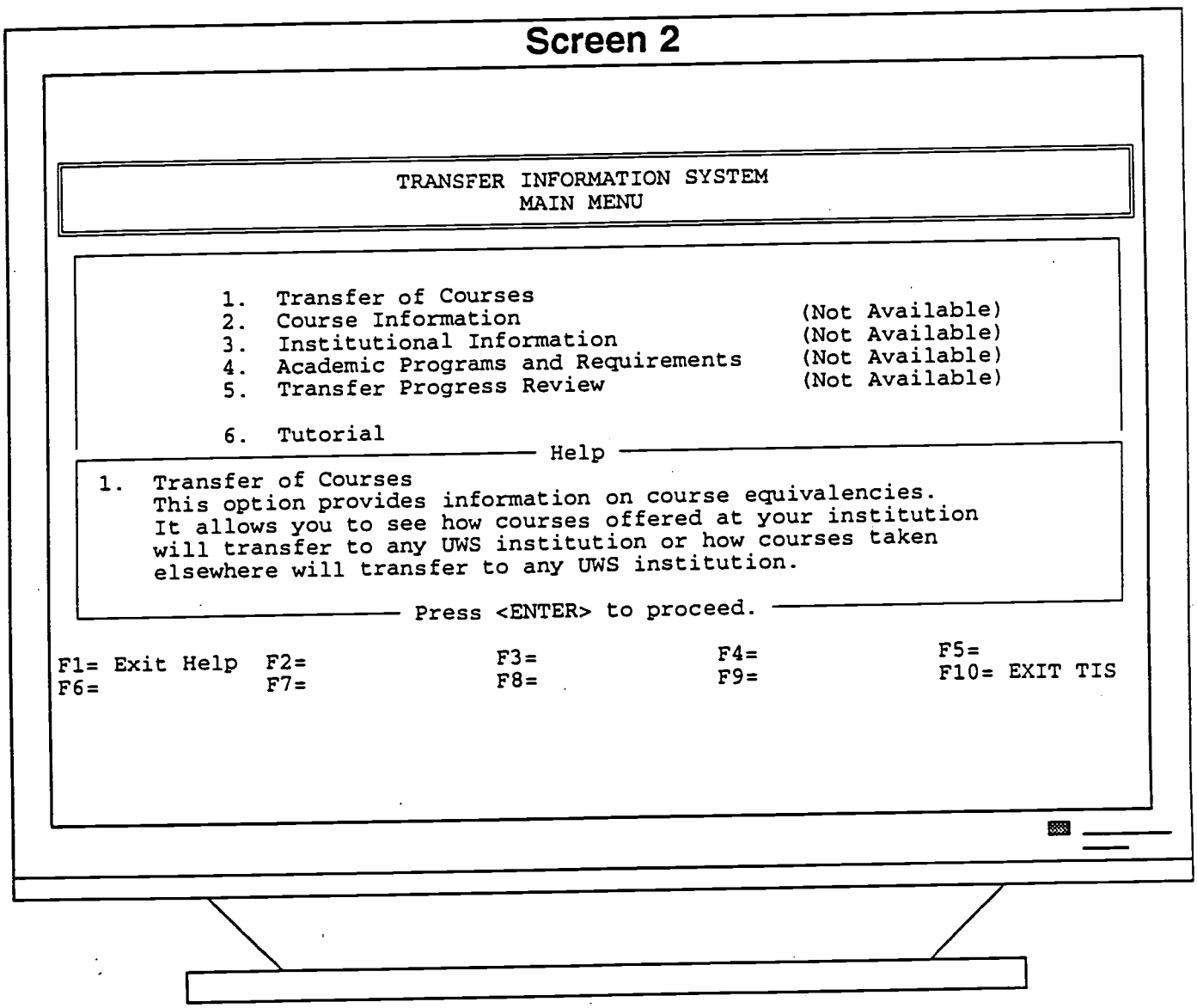
Screen 6—Course Equivalency Report

This report is a summary of the course equivalency detail seen on the previous screen. The user is encouraged to print this report upon completion of each TIS course equivalency query.

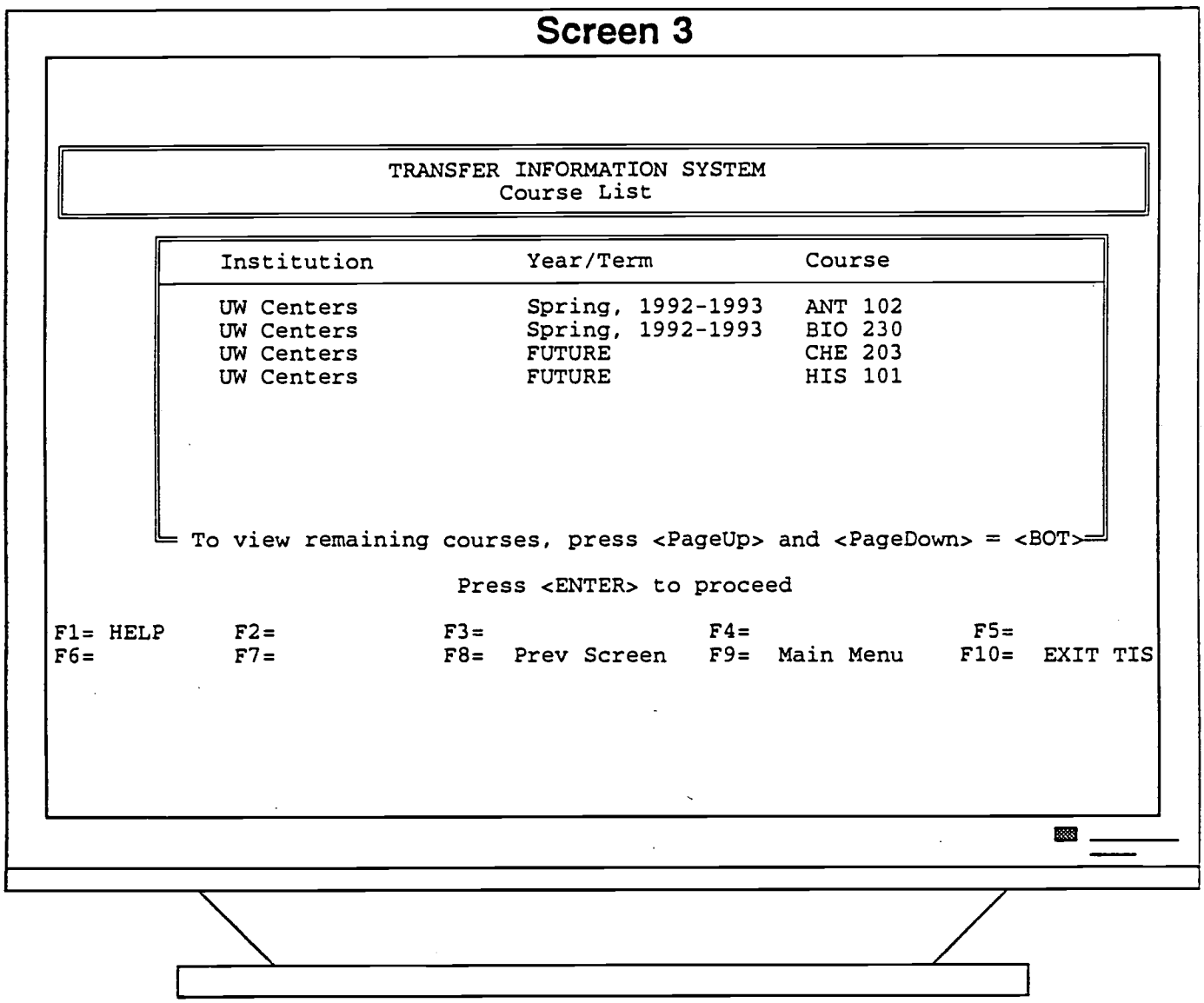
Screen 1


Welcome
to
TIS
Transfer Information System
Version 2.5
Copyright (c) 1991
by
University of Wisconsin System
All rights reserved
Press <Enter> to begin or <F10> to Exit to DOS...

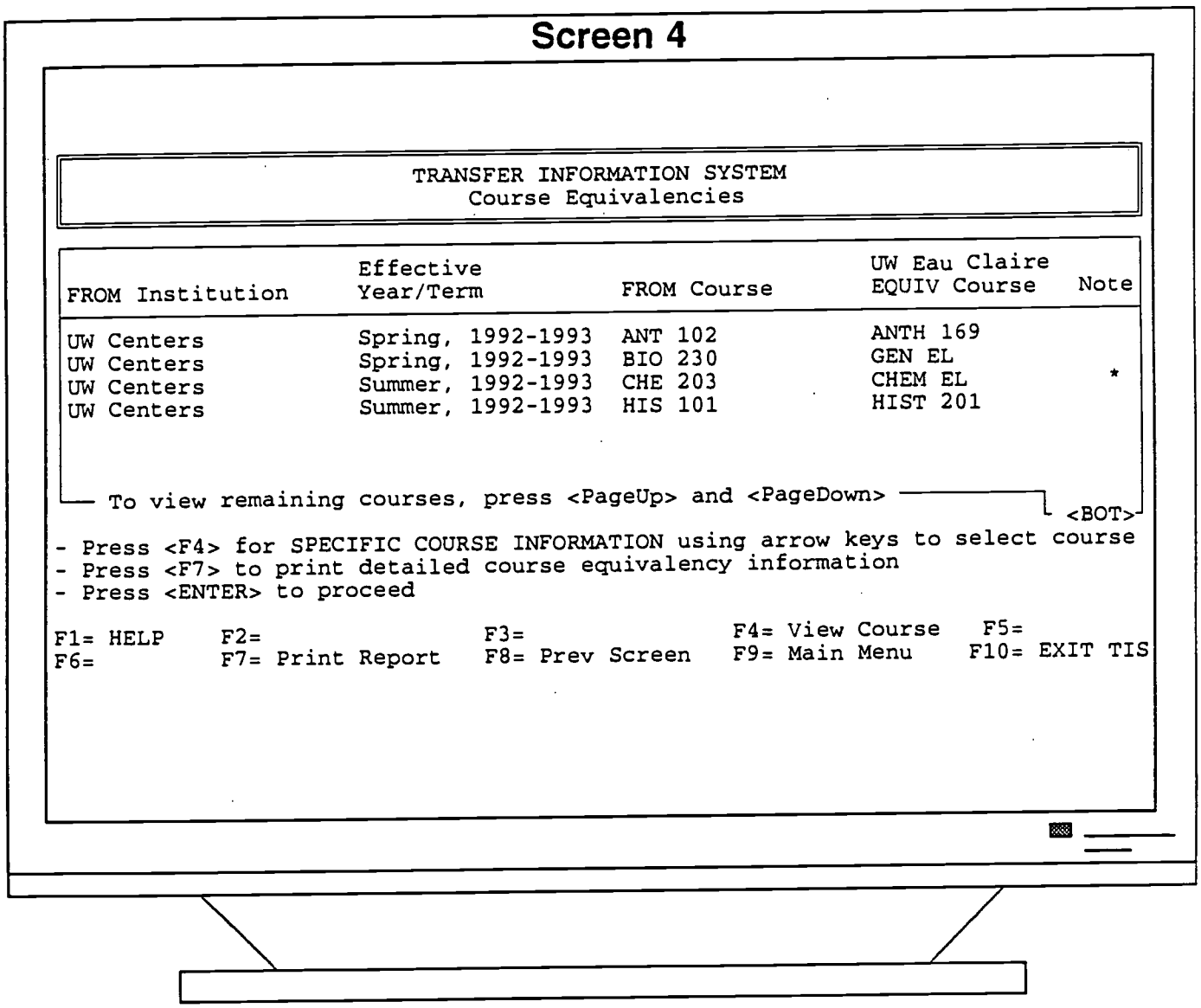
Screen 2


TRANSFER INFORMATION SYSTEM
MAIN MENU
1. Transfer of Courses
2. Course Information (Not Available)
3. Institutional Information (Not Available)
4. Academic Programs and Requirements (Not Available)
5. Transfer Progress Review (Not Available)
6. Tutorial
Help
1. Transfer of Courses
This option provides information on course equivalencies.
It allows you to see how courses offered at your institution
will transfer to any UWS institution or how courses taken
elsewhere will transfer to any UWS institution.
Press <ENTER> to proceed.
F1= Exit Help F2= F3= F4= F5=
F6= F7= F8= F9= F10= EXIT TIS

Screen 3


TRANSFER INFORMATION SYSTEM
Course List
Institution
Year/Term
Course
UW Centers
Spring, 1992-1993
ANT 102
UW Centers
Spring, 1992-1993
BIO 230
UW Centers
FUTURE
CHE 203
UW Centers
FUTURE
HIS 101
To view remaining courses, press <PageUp> and <PageDown> = <BOT>
Press <ENTER> to proceed
F1= HELP
F2=
F3=
F4=
F5=
F6=
F7=
F8= Prev Screen
F9= Main Menu
F10= EXIT TIS

Screen 4



TRANSFER INFORMATION SYSTEM
Course Equivalencies

FROM Institution	Effective Year/Term	FROM Course	UW Eau Claire EQUIV Course	Note
UW Centers	Spring, 1992-1993	ANT 102	ANTH 169	
UW Centers	Spring, 1992-1993	BIO 230	GEN EL	
UW Centers	Summer, 1992-1993	CHE 203	CHEM EL	*
UW Centers	Summer, 1992-1993	HIS 101	HIST 201	

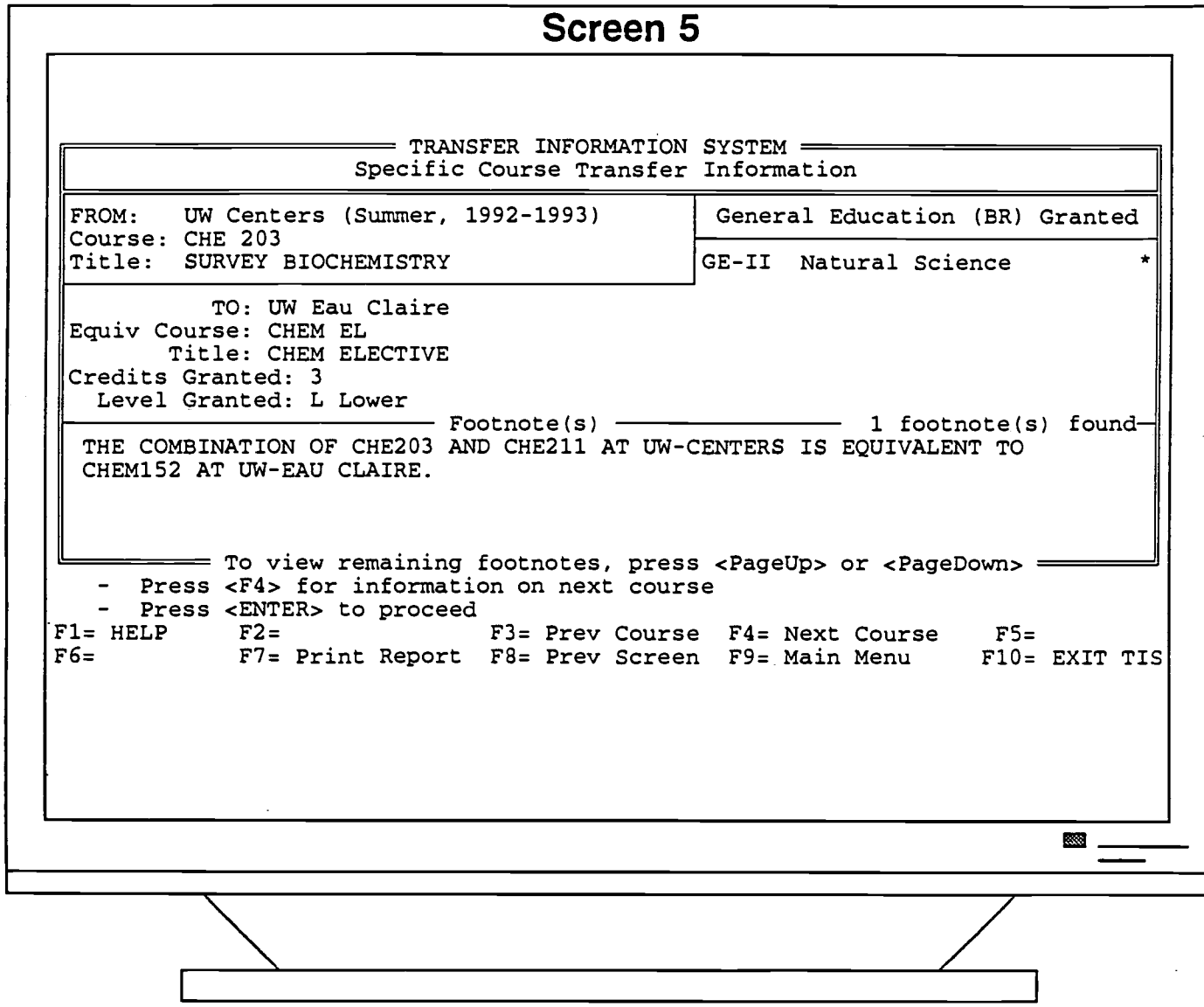
To view remaining courses, press <PageUp> and <PageDown>

<BOT>

- Press <F4> for SPECIFIC COURSE INFORMATION using arrow keys to select course
- Press <F7> to print detailed course equivalency information
- Press <ENTER> to proceed

F1= HELP F2= F3= F4= View Course F5=
F6= F7= Print Report F8= Prev Screen F9= Main Menu F10= EXIT TIS

Screen 5



```
                    TRANSFER INFORMATION SYSTEM
                  Specific Course Transfer Information

FROM:   UW Centers (Summer, 1992-1993)     General Education (BR) Granted
Course: CHE 203
Title:  SURVEY BIOCHEMISTRY                GE-II  Natural Science        *

          TO: UW Eau Claire
Equiv Course: CHEM EL
       Title: CHEM ELECTIVE
Credits Granted: 3
  Level Granted: L Lower
                          Footnote(s)          1 footnote(s) found
 THE COMBINATION OF CHE203 AND CHE211 AT UW-CENTERS IS EQUIVALENT TO
 CHEM152 AT UW-EAU CLAIRE.

          To view remaining footnotes, press <PageUp> or <PageDown>
   -  Press <F4> for information on next course
   -  Press <ENTER> to proceed
F1= HELP     F2=              F3= Prev Course  F4= Next Course    F5=
F6=          F7= Print Report  F8= Prev Screen  F9= Main Menu     F10= EXIT TIS
```

Screen 6

TRANSFER INFORMATION SYSTEM
Detailed Course Equivalency Report

STUDENT NAME: SUSAN STUDENT
TRANSFERRING FROM: UW Centers
TRANSFERRING TO: UW Eau Claire

Spring, 1992-1993

UW Centers Course	Title	UW Eau Claire Equiv Course	Title	Cr	Lvl	GE - Granted	FN
ART 102	INTERMEDIATE DRAWING	ART EL	ART ELECTIVE	3.00	L	*	
BIO 230	BIOL REVOLTN:DESTINY	GEN EL	GENERAL ELECTIVE	3.00	L	*	

* - GENERAL EDUCATION/BREADTH:

Course	GE Granted
ART 102	GE-IV = Humanities
BIO 230	GE-III = Natural Science

** - FOOTNOTES:

No Footnotes found for courses listed above

FUTURE

Effective Yr/Term	UW Centers Course	Title	UW Eau Claire Equiv Course	Title	Cr	Lvl	GE - Granted	FN
Summer, 1992-1993	CHE 203	SURVEY BIOCHEMISTRY	CHEM EL	CHEM ELECTIVE	3.00	L	*	**
Summer, 1992-1993	HIS 101	US HIST TO CIVIL WAR	HIST 201	U S TO 1877	3.00	L	*	

* - GENERAL EDUCATION/BREADTH:

Yr/Term	Course	GE Granted
Summer, 1992-1993	CHE 203	GE-II = Natural Science
Summer, 1992-1993	HIS 101	GE-IV = Humanities

** - FOOTNOTES:

Summer, 1992-1993	CHE 203	THE COMBINATION OF CHE203 AND CHE211 AT UW-CENTERS IS EQUIVALENT TO CHEM152 AT UW-EAU CLAIRE.

Lvl = LEVEL:

P = Preparatory/Pre-Collegiate/Remedial		Blank = Not Used
L = Lower	E = Elementary	A = Advanced
U = Upper	I = Intermediate	D = Intermediate or Advanced

NOTE: TIS is a transfer information guide for students and staff in the UW and VTAE Systems. Although the information is intended to be current and accurate, it should NOT be considered a contract or a substitute for formal admission procedures. Course transfer information may vary based upon specific majors or programs. You are encouraged to discuss your specific circumstances with an advisor and to periodically refer to TIS for updated information.

Appendix II

Appendix II provides a sample of screens that are included in the TIS on-line maintenance system. The following is a list and description of the screens:

Figure 1—Maintenance Menu

Figure 1 shows the TIS Maintenance Menu, which lists the different functions that may be performed within the TIS maintenance system.

Figure 2—General Help

Figure 2 shows an example of one type of help that is available to help users with the maintenance functions and screens. General help provides basic information about how the system works.

Figure 3—Field Help

Figure 3 shows an example of another type of help. Field help provides a list of valid entries for a specific field, where applicable, with information describing use of the field.

Figure 4—Find Which Equivalencies

Figure 4 shows the Find Which Equivalencies Screen, which is used to search for a specific equivalency or a group of equivalencies.

Figure 5—List Equivalencies

Figure 5 shows the List Equivalencies Screen, which is used to review a group of equivalencies and select an equivalency for detailed review or update.

Figure 6—Equivalency Detail

Figure 6 shows the Equivalency Detail Screen, which is used to review and/or update a specific equivalency.

Figure 7—Footnote Text

Figure 7 shows the Footnote Text Screen, which is used to review and/or update footnote text records. Footnote text records may be used to provide additional information about a transfer equivalency.

Figure 1

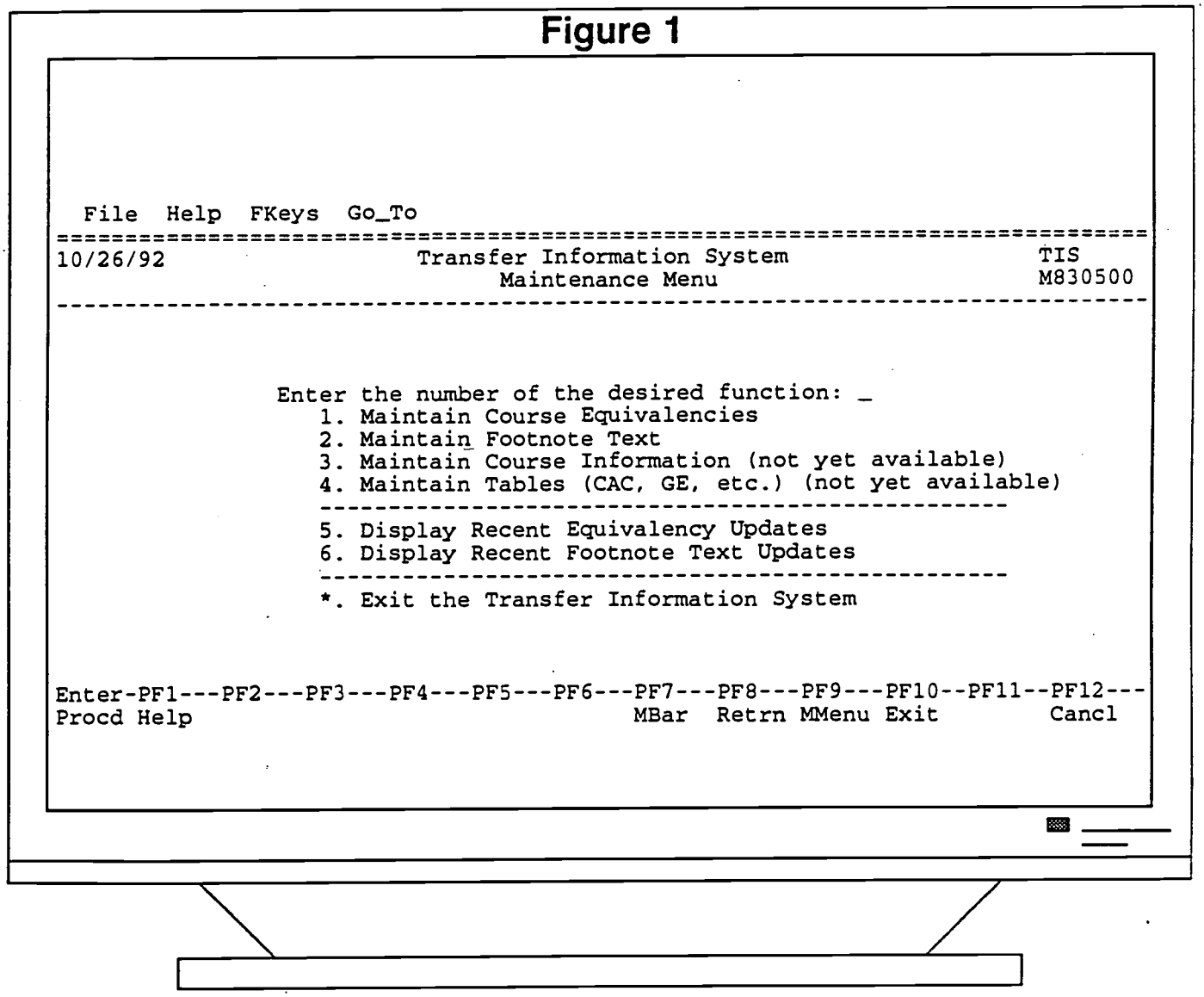

File Help FKeys Go_To
10/26/92
Transfer Information System
Maintenance Menu
TIS
M830500
Enter the number of the desired function: _
1. Maintain Course Equivalencies
2. Maintain Footnote Text
3. Maintain Course Information (not yet available)
4. Maintain Tables (CAC, GE, etc.) (not yet available)
5. Display Recent Equivalency Updates
6. Display Recent Footnote Text Updates
*. Exit the Transfer Information System
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
Procd Help
MBar Retrn MMenu Exit
Cancl

Figure 2

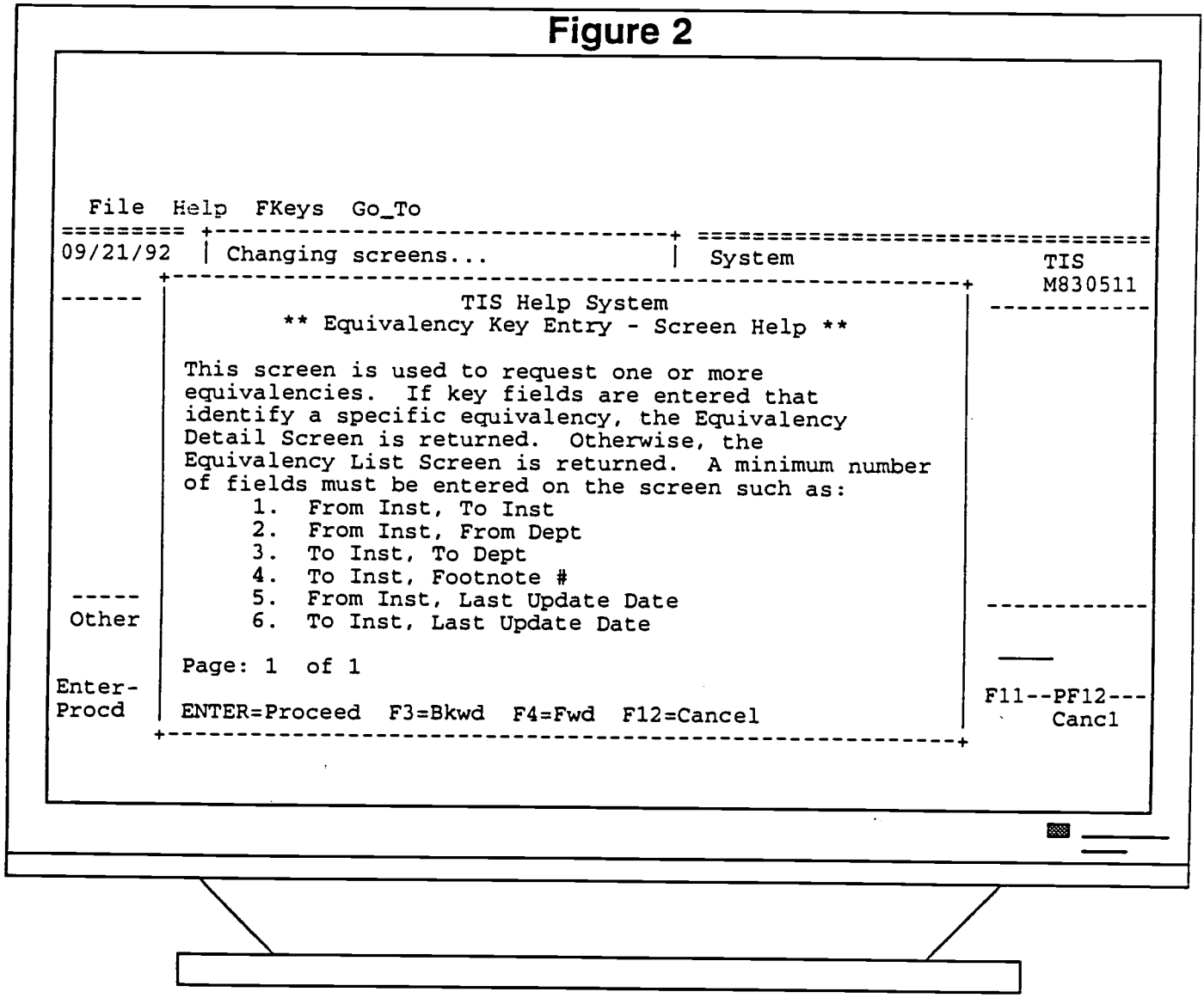

File Help FKeys Go_To
09/21/92
Changing screens...
System
TIS
M830511
TIS Help System
** Equivalency Key Entry - Screen Help **
This screen is used to request one or more equivalencies. If key fields are entered that identify a specific equivalency, the Equivalency Detail Screen is returned. Otherwise, the Equivalency List Screen is returned. A minimum number of fields must be entered on the screen such as:
1. From Inst, To Inst
2. From Inst, From Dept
3. To Inst, To Dept
4. To Inst, Footnote #
5. From Inst, Last Update Date
6. To Inst, Last Update Date
Page: 1 of 1
ENTER=Proceed F3=Bkwd F4=Fwd F12=Cancel
Other
Enter-
Procd
F11--PF12---
Cancl

Figure 3

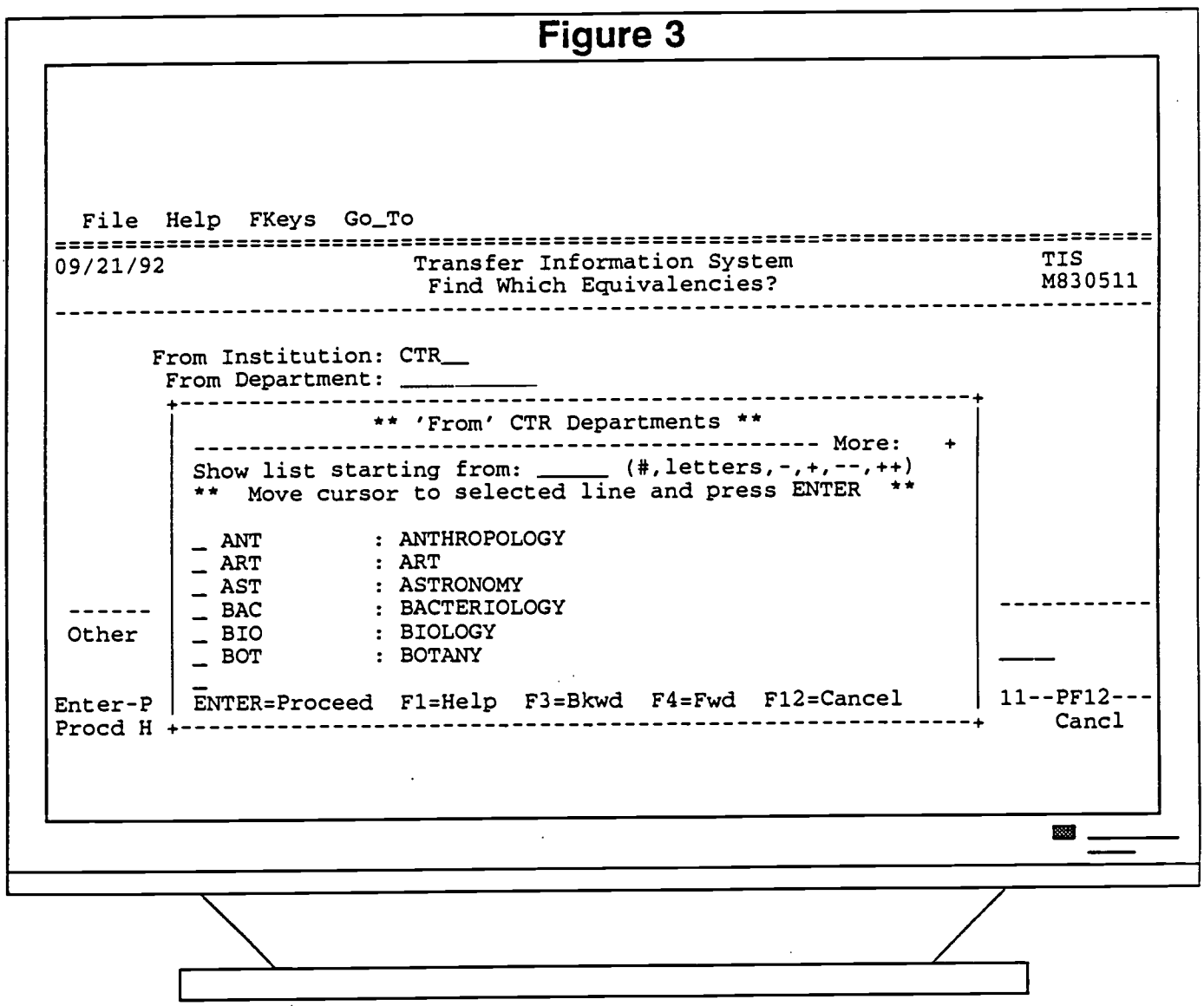

File Help FKeys Go_To
09/21/92
Transfer Information System
Find Which Equivalencies?
TIS
M830511
From Institution: CTR__
From Department: _____
** 'From' CTR Departments **
More: +
Show list starting from: _____ (#,letters,-,+,--,++)
** Move cursor to selected line and press ENTER **
_ ANT : ANTHROPOLOGY
_ ART : ART
_ AST : ASTRONOMY
_ BAC : BACTERIOLOGY
_ BIO : BIOLOGY
_ BOT : BOTANY
_
ENTER=Proceed F1=Help F3=Bkwd F4=Fwd F12=Cancel
Other
Enter-P
Procd H
11--PF12---
Cancl

Figure 4

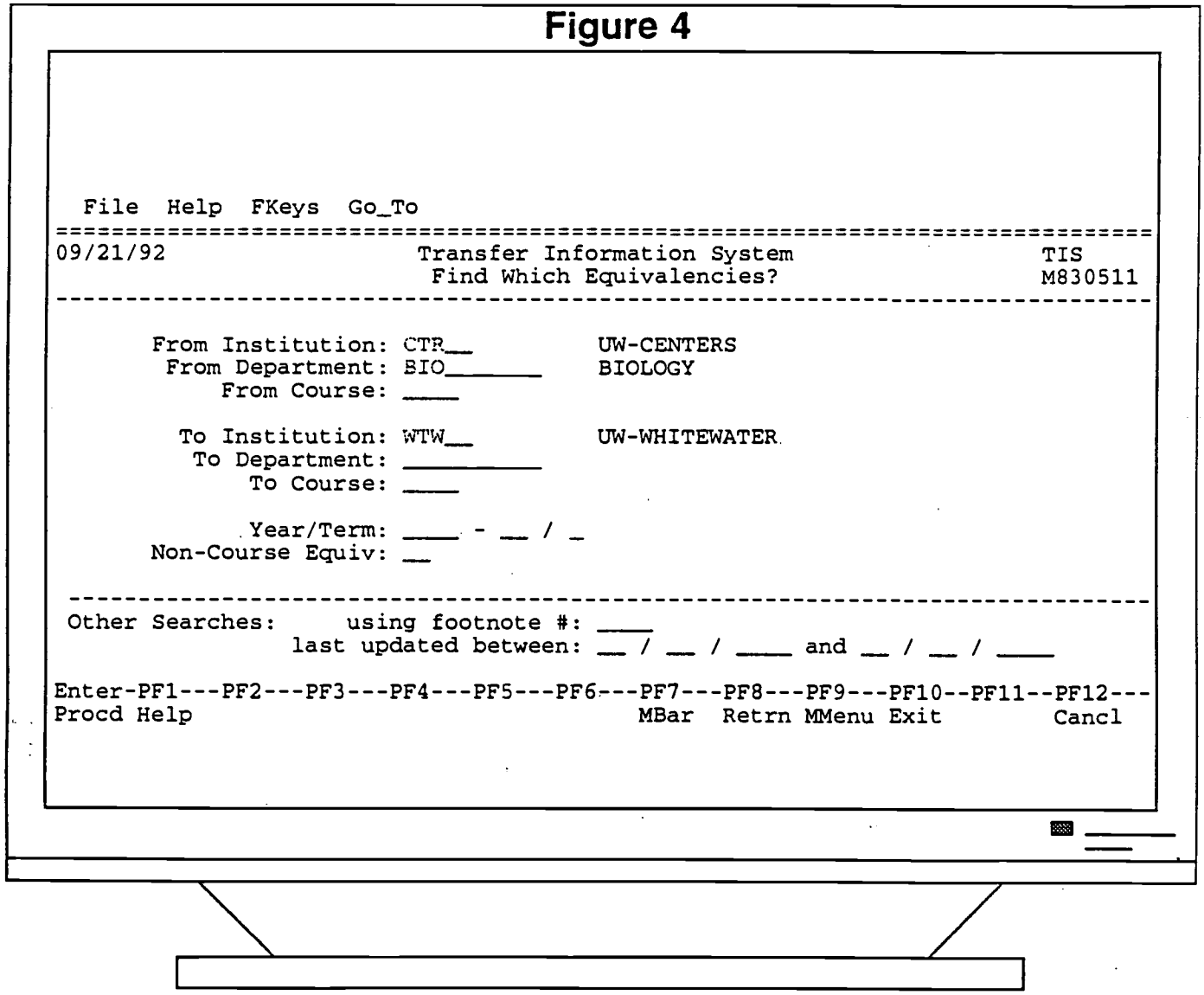
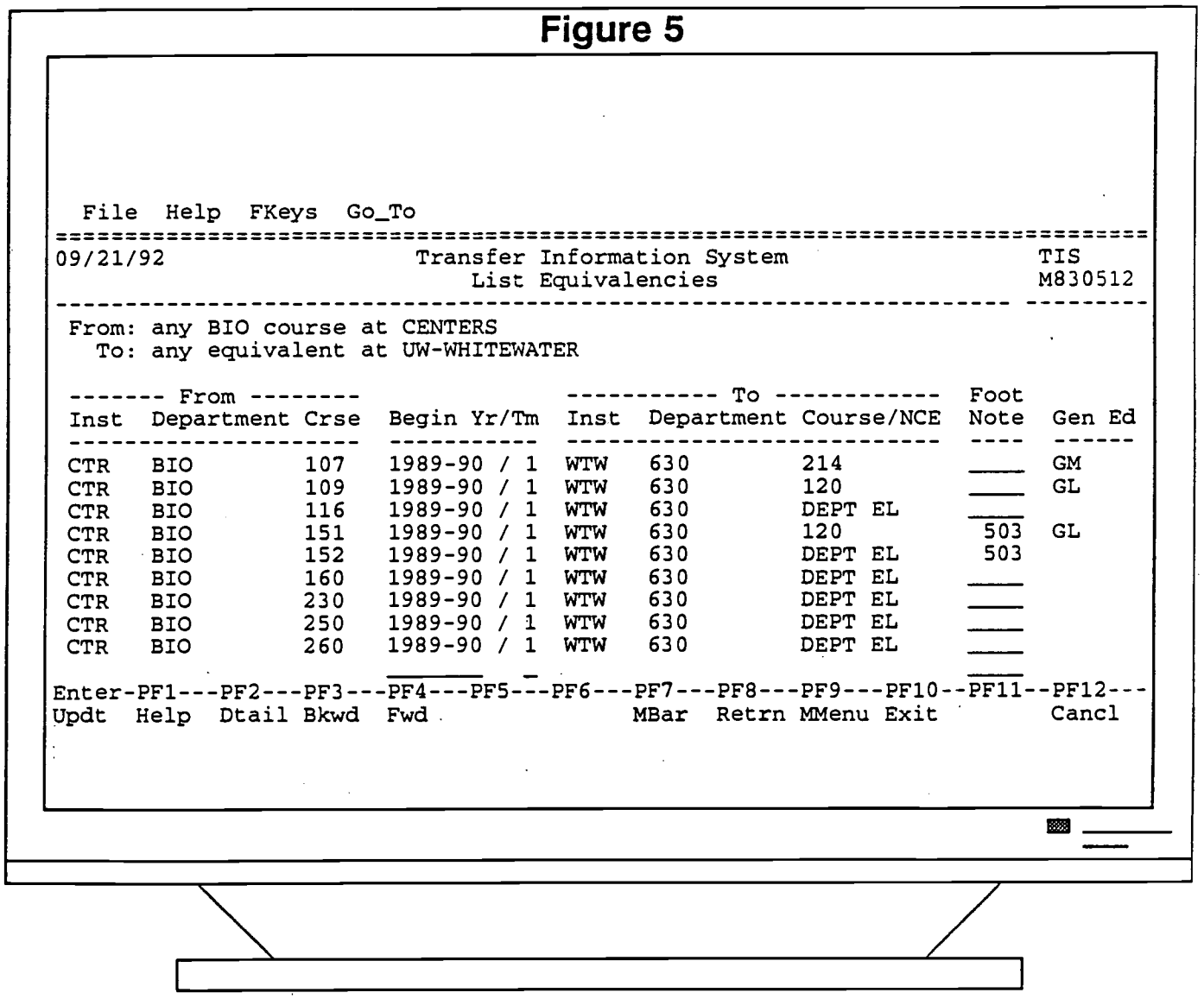


Figure 5



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  File  Help  FKeys  Go_To
================================================================================
09/21/92                    Transfer Information System                    TIS
                                List Equivalencies                         M830512
-------------------------------------------------------------------------- --------
 From: any BIO course at CENTERS
   To: any equivalent at UW-WHITEWATER

 ------- From --------                ----------- To ------------  Foot
 Inst  Department Crse  Begin Yr/Tm  Inst  Department Course/NCE   Note  Gen Ed
 --------------------  -----------  ----------------------------  ----  ------
 CTR   BIO        107   1989-90 / 1  WTW   630        214          ____  GM
 CTR   BIO        109   1989-90 / 1  WTW   630        120          ____  GL
 CTR   BIO        116   1989-90 / 1  WTW   630        DEPT EL      ____
 CTR   BIO        151   1989-90 / 1  WTW   630        120           503  GL
 CTR   BIO        152   1989-90 / 1  WTW   630        DEPT EL       503
 CTR   BIO        160   1989-90 / 1  WTW   630        DEPT EL      ____
 CTR   BIO        230   1989-90 / 1  WTW   630        DEPT EL      ____
 CTR   BIO        250   1989-90 / 1  WTW   630        DEPT EL      ____
 CTR   BIO        260   1989-90 / 1  WTW   630        DEPT EL      ____
                        _______ _                                  ____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
Updt  Help  Dtail Bkwd  Fwd             MBar  Retrn MMenu Exit        Cancl
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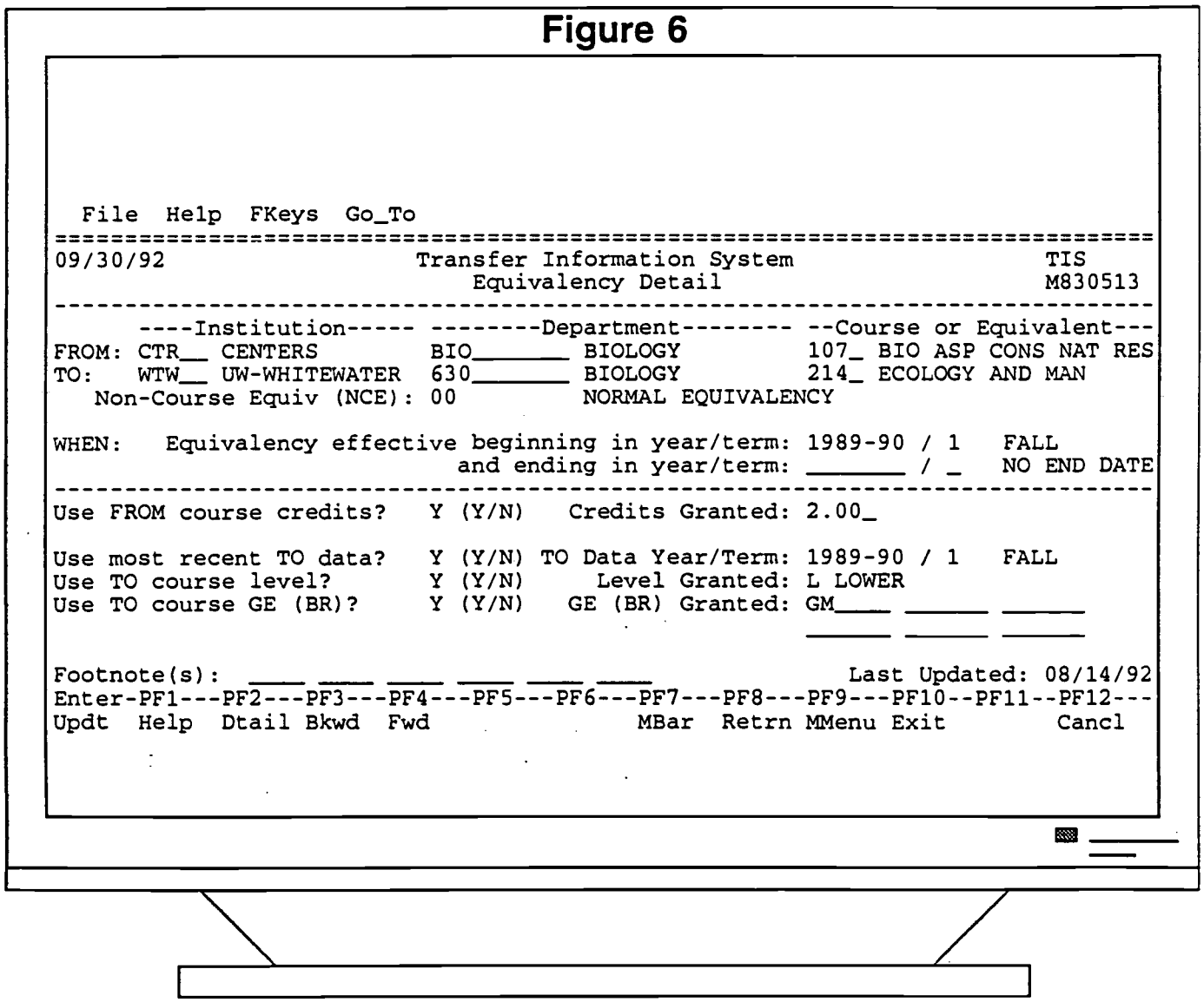
Figure 6



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================================================================================
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                             Equivalency Detail                          M830513
--------------------------------------------------------------------------------
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FROM: CTR__ CENTERS         BIO_______ BIOLOGY          107_ BIO ASP CONS NAT RES
TO:   WTW__ UW-WHITEWATER   630_______ BIOLOGY          214_ ECOLOGY AND MAN
   Non-Course Equiv (NCE): 00          NORMAL EQUIVALENCY

WHEN:   Equivalency effective beginning in year/term: 1989-90 / 1   FALL
                            and ending in year/term: _______ / _   NO END DATE
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Use FROM course credits?   Y (Y/N)   Credits Granted: 2.00_

Use most recent TO data?   Y (Y/N) TO Data Year/Term: 1989-90 / 1   FALL
Use TO course level?       Y (Y/N)     Level Granted: L LOWER
Use TO course GE (BR)?     Y (Y/N)   GE (BR) Granted: GM____ ______ ______
                                                      ______ ______ ______

Footnote(s): ____ ____ ____ ____ ____ ____                Last Updated: 08/14/92
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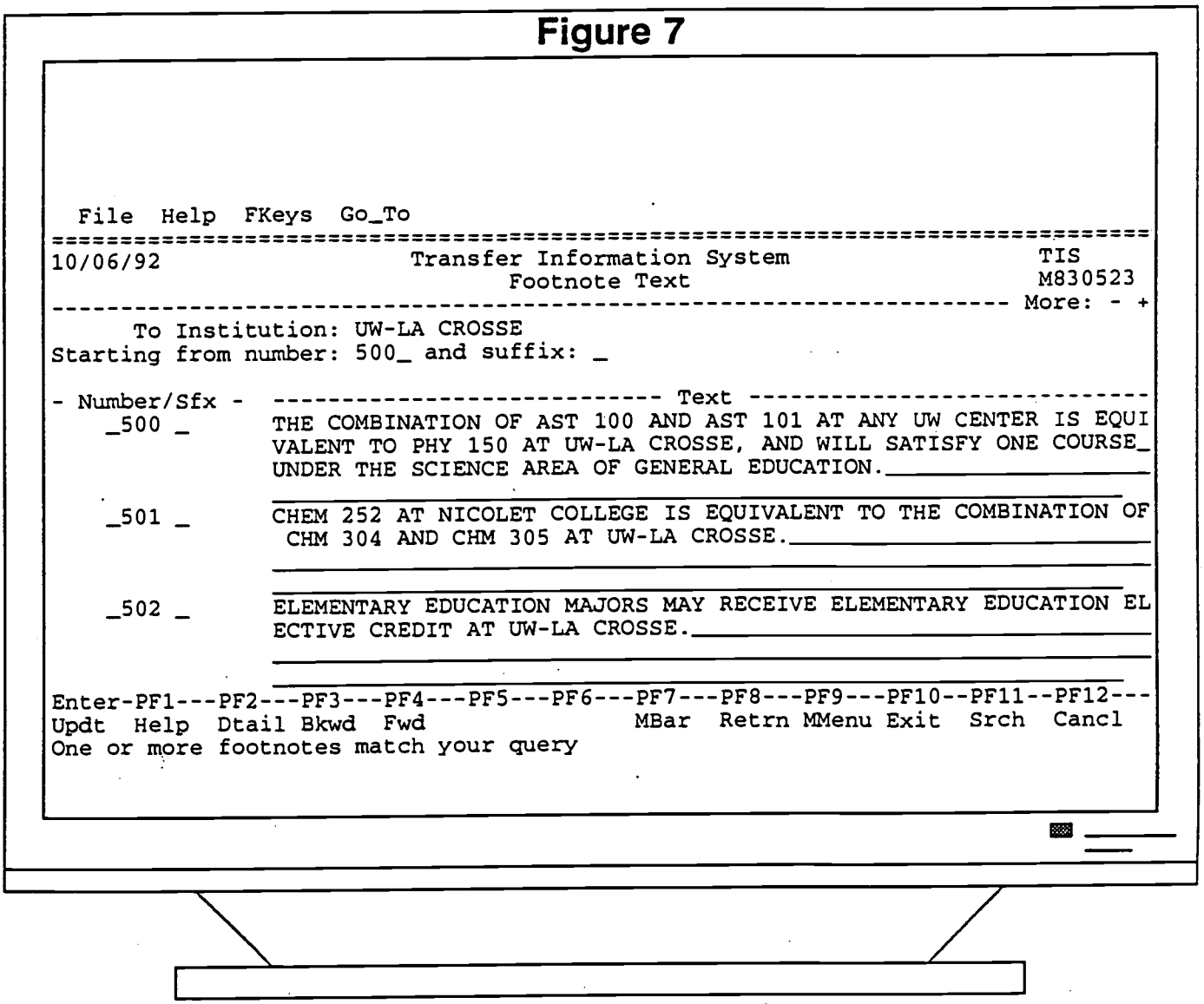
Figure 7



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                                Footnote Text                              M830523
-------------------------------------------------------------------- More: - +
      To Institution: UW-LA CROSSE
Starting from number: 500_ and suffix: _

- Number/Sfx -  ---------------------------- Text ----------------------------
    _500 _      THE COMBINATION OF AST 100 AND AST 101 AT ANY UW CENTER IS EQUI
                VALENT TO PHY 150 AT UW-LA CROSSE, AND WILL SATISFY ONE COURSE_
                UNDER THE SCIENCE AREA OF GENERAL EDUCATION._____________
                _____________________________________________________________

    _501 _      CHEM 252 AT NICOLET COLLEGE IS EQUIVALENT TO THE COMBINATION OF
                 CHM 304 AND CHM 305 AT UW-LA CROSSE._____________________
                _____________________________________________________________
                _____________________________________________________________

    _502 _      ELEMENTARY EDUCATION MAJORS MAY RECEIVE ELEMENTARY EDUCATION EL
                ECTIVE CREDIT AT UW-LA CROSSE._____________________________
                _____________________________________________________________
                _____________________________________________________________

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
Updt  Help  Dtail Bkwd  Fwd               MBar  Retrn MMenu Exit  Srch  Cancl
One or more footnotes match your query
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Iran: Recent Educational Developments

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ETS Consultant
Trans-Canada Educational Evaluation Service

Introduction

Probably the most distinctive characteristic of education in Iran today is change. Although things are far less turbulent than in the years immediately following the Revolution, there is still consolidation and expansion taking place. Despite continued strained relations between the governments of Iran and the United States, many Iranian students are currently studying and applying to study in North America. The Iranian Ministry of Culture and Higher Education estimates that there are approximately 50,000 students currently studying abroad. Of the 4,000 sponsored scholarship students, the largest number are in Canada. In this paper, some impressions of Iranian education, together with information supplied by various ministries, universities, and educators during three recent visits will be summarized. The assistance of Dr. Reza Hosseini, Higher Education Adviser at the Iranian Embassy in Ottawa, is particularly appreciated.

The School System

The school system is under the jurisdiction of the Ministry of Education and Guidance, which has the responsibility to "purify and educate the children of the Islamic Republic of Iran."

The educational system under this Ministry is structured as follows:

- Preprimary Education—a one-year program for children 5 years of age.
- Primary Education—a five-year stage for children aged 6 to 10.
- Guidance Cycle—a three-year stage for children aged 11 to 13.
- Secondary Education—a four-year stage for children aged 14 to 17. There are four streams within the academic secondary program: Mathematics and Physics, Experimental Sciences, Literature and Culture, and Socioeconomics.
- Technical-Vocational Education—a four-year stage for secondary students. There are three streams within this stage: Technical, Business and Vocational, and Agriculture.

The Ministry of Education and Culture also has jurisdiction over the Higher Institutes of Technical and Vocational Education which offer postsecondary programs, and a program of exceptional education for four groups of students (the blind and deaf, the mentally retarded, children with behavioral problems, and the exceptionally creative and intelligent students). Some higher institutes include teacher training centers.

Prior to the Revolution, only 29.4% of the population over 7 years of age was literate. To improve this, in 1979 a literacy movement was undertaken under the direction of this Ministry, with most literacy classes taught by volunteers. Between 1979 and 1983 almost 3 million students were enrolled in these classes. The Ministry is also involved in educational research and curriculum development.

Examinations continue to be important in the school system. In the primary stage, promotion is based on annual examinations. At the end of grade 5, promotion to the guidance cycle depends on successful completion of a national examination. Students may attempt this exam in two consecutive years, after which they lose the chance to advance to the guidance cycle. Such students must either seek employment or enter a vocational program. At the end of the guidance cycle students take a regional examination administered by provincial education authorities. A certificate of general education is granted to successful students, who are then eligible to enter the secondary stage. There are specific subject and performance requirements for admission to some secondary programs. National examinations are conducted at the end of each stage in the secondary cycle. The final examination is the *konkur*, which serves as the general national entrance examination for admission to university.

Several changes to the system were announced in 1992, but, unfortunately, little information about these changes is available other than that English as a Second Language will be introduced in grade 7. Private schools, which were closed following the Revolution, were permitted to open again in 1987 as nonprofit institutions. There are several large language schools currently operating. Although education is free and compulsory for the first five years of schooling, there are differences in the availability of schools and programs between urban and rural areas and different parts of the country. Consequently, the objectives of the government to have full enrollment in the primary grades and to have general education for the first eight years have not been met. However, enrollment in grades 6 through 12 has been increasing since 1982-83, when approximately 40% of secondary school age children were enrolled.

Teacher Education in Iran

Teacher training for primary education and the guidance cycle is the responsibility of the Ministry of Education, which has established special rural Teacher Training Centers because of a serious shortage of teachers in rural areas. Secondary school teacher training occurs in universities under the jurisdiction of the Ministry of Culture and Higher Education. Vocational and technical teacher training takes place in special colleges.

Primary and Guidance Teacher Training, Grades 1-8

Rural Teacher Training Centers

- four years after the guidance cycle (grade 8)
- graduates will teach in rural schools

daneshsarai-moghadamati

- two years after the first two years of secondary school (grade 10)
- rural and urban primary school teachers

daneshsarai-rahnamai

- two years after secondary school (grade 12)
- primary and guidance cycle teachers (14 branches)
  - Primary education
  - Persian language
  - English language
  - German language
  - French language
  - Experimental sciences
  - Social sciences
  - Mathematics
  - Vocational and technical training
  - Islamic ethics and Arabic language
  - Art
  - Fostering affairs (Child development)
  - Physical education
  - Exceptional children (geniuses; the blind and partly blind; the deaf and partly deaf; mentally retarded, teachable; behavioral and physical defects)
- graduates may receive a *fogh-e diplome* (now called *kar-dani*)

Secondary Teacher Training

Secondary school teachers train at tertiary-level institutions. They must have a *licence* (bachelor's degree) for both the academic and technical streams. There are two ways to qualify. A holder of a *licence* in a field other than education can complete a one-year program; a secondary school graduate can complete a four-year program leading to a *licence* (Bachelor of Education). This can be done in two stages of two years each. At the end of the first two years a graduate receives the *kar-dani* and can teach the guidance cycle.

Programs are offered at universities under the jurisdiction of the Ministry of Culture and Higher Education.

Tarbiyat Moelem University, Tehran

- secondary school graduate and special entrance examination

Faculties of Education at Major Universities

- secondary school graduate and pass in the general entrance examination (*Konkur*).

Colleges of Education, Ministry of Education, for Vocational and Technical Teachers.

- secondary school graduate
- four-year program usually offered in two stages of two years each

(Note: The faculty of education at the University of Tehran trains educational specialists, not classroom teachers. Several major universities, e.g., Tabriz, Mashhad and Esfahan, offer postgraduate degrees in education. There is also a four-year program leading to a *licence* in counselling and guidance.)

Postsecondary Education

The two ministries responsible for most postsecondary education are the Ministry of Culture and Higher Education (MCHE) and the Ministry of Health and Medical Education (MHME). MCHE was formed in 1979 when the Ministries of Science and Higher Education and the Ministry of Culture and Art were amalgamated. There is also a Ministry of Culture and Islamic Guidance.

The High Council for Cultural Revolution (HCCR), established in 1985 and chaired by the President of the Islamic Republic of Iran, dominates the higher education scene. This Council authorizes the formation of new institutions, oversees educational policy and planning for all levels of education, and controls the selection process for admission to postsecondary institutions. While admission is still based on the results of the general entrance examination (*konkur*), there are quotas for applicants from various areas of the country and other factors that are taken into account. The admissions criteria are established by the High Council for Educational Planning, which is affiliated with the HCCR. Since the closure of the universities between 1980 and 1983 there have been many changes both in institutions and fields of study. In 1989 the MCHE reported that there were over 100 institutions of higher education. Of these, 30 were universities, 14 university complexes and colleges, five nongovernmental colleges, and 36 higher education centers and technical institutes affiliated to various ministries and government agencies. Many of the universities have been formed from an amalgamation of existing institutions and/or faculties. Several have had two or three names.

Institutions operated by other ministries are recognized by MCHE, and their programs are approved by the related department within MCHE.

- Private language schools operate under the jurisdiction of the Ministry of Education and Guidance. Recently the MCHE has given permission for some private nonprofit institutes to operate on condition that all programs and degrees are approved by MCHE.
- The Islamic Azad University is a private open university which operates throughout Iran. It is not under the jurisdiction of any ministry, and its degrees and courses are not recognized by MCHE or by Iranian universities for advanced standing. It has no campus and uses staff and facilities from other institutions.
- The Payam Nour University is a home study institute recognised by MCHE. Courses are given through television and correspondence, and students write exams at local university offices.

- Another institution that includes both schools and postsecondary education is called the Hozeh-Elmieh which operates several centers including Qum, Mashhad, and Esfahan. There is one in Najaf, Iraq. Each *Hozeh* is controlled by an Ayatollah and has its own system of evaluation, which is not on a credit unit basis. Although primarily concerned with theological education at the postsecondary level, these institutions also offer more general education and qualifications.

The grading system has now been unified on a 0-20 scale. The letter grade equivalents are:

A = 17-20
B = 14-16.9
C = 12-13.9
D = 10-11.9

The minimum grade for a subject credit in undergraduate programs is 10, in graduate programs 12, and in Ph.D. programs 14.

Credit at universities is awarded on a unit basis. No part-time studies are available, and there are time limits on the completion of all degrees. One unit is equal to one hour of theory or two hours of laboratory work or three hours of research for 17 weeks including examinations. Undergraduate students can register for a minimum of 14 units and a maximum of 21 units per term based on academic performance in the previous term. A *kar-shenasi* (bachelor's; previously called a *licence*) degree requires a minimum of 153 units passed with a minimum overall average of 12 out of 20. Graduate students can register for a minimum of 6 and a maximum of 12 units per term. The normal load is 9 units, and a *karshenasi-arshad* (master's) degree is awarded upon the completion of a minimum of 38 units with a minimum overall average of 14 out of 20. Depending on the field of study, this degree can be awarded for coursework only, a minimum of 30 units and a thesis, or a minimum of 22 units and a research-based thesis.

In the fields of dentistry, medicine, pharmacy, and veterinary medicine, a first degree called a *karshenasi-arshad-payasteh* (master's), may be awarded. This degree requires the completion of 210-290 units beyond secondary school and a dissertation. A Ph.D. requires three years of study after a master's degree and the successful completion of 60 units with a minimum overall average of 15 in each term. When 30 units of coursework have been successfully completed, the candidate sits for a comprehensive exam, after which a thesis is completed. The maximum period of study for a Ph.D. is six years.

Students from institutions under the jurisdiction of MCHE should be able to obtain transcripts unless they owe a university money. Such students will not be issued transcripts even if they are scholarship students. Official transcripts are issued and translations are sealed by the Justice Administration of the Islamic Republic of Iran. The originals of these translations are returned to the university and are not given to the student. Three universities—Amir Kibir University, Sharif University of Technology, and Shiraz University—issue transcripts *only* in English. This includes transcripts issued directly to students.

The Ministry of Health and Medical Education (MHME) was established in 1986 by the HCCR. The Ministry has jurisdiction over 21 Universities of Medical Sciences and 12 Colleges of Medical Sciences. These are listed in Appendix B. Admission to programs is based on the results of the *konkur,* with preference being given to applicants from, and those who will serve, areas of the country designated as deprived in terms of health care availability. The Ministry awards associate diplomas as well as bachelor of science, master of science, General Medical Doctorate, and professional doctorate degrees, and provides training in specialties. Each university is assigned a community practice area that consists of a district health network up to 100 kilometers from the university. Although degree and diploma programs are offered on a fulltime basis, these degrees may be either "continuous" or "discontinuous." There are minimum and maximum time periods for the completion of all programs. A list of the programs and specialties offered is shown in Appendix B.

Appendix A lists the universities, university complexes and higher education centers, and shows the previous names and institutional consolidations. However, several medical universities are not included in this listing. Unfortunately, although publications in English are produced by various ministries, these are difficult to obtain. Announcements of impending changes may be made in advance of details being available. For example, MHME has announced that a new scheme of medical education has been approved by the High Council for Educational Planning which also revises the number of categories of students within the system. It often takes time to obtain information from government agencies and institutions in Iran. Mail is often slow, although this can sometimes be speeded up if the address can be translated into Persian. Telephone and FAX communication is sometimes difficult.

Glossary of Terms

Note: Where appropriate old and new titles of awards and institutions are shown. These still tend to be used interchangeably.

Amuzeshgah. Secondary vocational school.
Amuzeshkadeh or *Amuzeshkadeh-fani.* Postsecondary technical institutions offering only associate diplomas.
Azid. Open, as in Islamic Azid University.

Dabestan. Primary school, grades 1-5.
Dabirestan. Secondary school, grades 9-12.
Daneshgah. University.
Daneshkadeh. Faculty of a postsecondary institution.
Daneshsarai-moghadamani. Primary school teacher training institution.
Daneshsarai-rahnamli. Guidance cycle teacher training institution.
Diplome or *Gavahi-nameh dabirestan.* Secondary school certificate.
Doctora. Doctorate.
Doreh-e-rahamii. Guidance cycle, grades 6-8.

Fogh-e diplome. Associate diploma.
Fogh-e licence or *Karshenasi-arshad.* Master's degree.

Honarestan. Secondary technical school.

Karshenasi. Bachelor's degree.
Karshensi-arshad payvasteh. A six-year master's (first) degree offered in certain fields such as veterinary medicine.
Konkur. National secondary school leaving examination used for admission to postsecondary institutions.
Kudakestan. Kindergarten, preprimary year.

Licence or *Karshenasi.* Bachelor's degree.

Madrasai-ali. College of Advanced Education awarding associate diplomas and bachelor's degrees.
Mojtamah-e amuzesh-e ali. Higher Education Center.
Mojtamah-e daneshgahi. University complex.

Napayvasteh. Discontinuous, used as a suffix with a degree title.

Payvasteh. Continuous, used as a suffix with a degree title.

Appendix A

In this appendix, higher education institutions are divided into three groups: universities, complexes and higher education centers, and colleges. While this division, to some extent, reflects the relative status of these institutions, it should not be seen entirely as an attempt to rank the institutions of higher education. It should be pointed out again that the nature of amalgamations has made the relative ranking of institutions, compared to the pre-revolutionary period, less straightforward. For example, some of the most prestigious pre-revolutionary institutions, such as Abaden College of Petroleum, are placed in the third group, and this, of course, does not indicate that they have a status lower than that of the first group of universities. Similarly, some of the best specialized institutions of the pre-revolutionary period now form part of the post-revolutionary universities (such as the Industrial Management Institute, which has been amalgamated with the Allameh-Tabatabie University). The purpose of the grouping adopted here, therefore, is to make the identification of institutions easier rather than to comment on their status or educational standards.

Universities

Al-Zahra University, Tehran, 1964 (Public-MCHE). First established as a private institution under the name Iran's Girls' College. Renamed Farah Pahlavi University in 1975. In 1981 it assumed public status and its present name. Four faculties offer associate diplomas and bachelor's degrees in 20 fields of study.

Amir Kabir University of Technology, Tehran, 1958 (Public-MCHE). First established as an industrial college. In 1965 it was renamed the Tehran Polytechnique. Its present name dates back to 1983. Twelve faculties offer bachelor's, master's, and Ph.D. degrees in 50 fields of study. The Shipbuilding College of Bandar Abass, and Research Center at Tafarosh are affiliated institutions which offer bachelor's and master's degrees.

Allameh-Tabatabie University, Tehran, 1984 (Public-MCHE). In 1984 the Literature and Humanities University Complex and the Commerce and Business Administration University Complex were amalgamated to form this University. These two Complexes had been formed as a result of the amalgamation of a number of colleges of advanced education in 1979. The colleges which formed these complexes and now constitute this university, are as follows:

Literature and Humanities University Complex: College of Social Services (1958), College of Literature and Foreign Languages (1964), College of Social Communications (1966), College of Pars (1967), College of Damavand (1969), College of Translation (1969), Research Center for Iranian Culture (1970), College of Political and Social Science (1971), Teacher Training College (1973), College of Shimran (1973).

University Complex of Commerce and Business Administration: Tehran College of Commerce (1958), College of Banking (1964), Tehran College of Insurance (1970), College of Iran Zamin (1969), Industrial Management Institute (1970), College of Tourism and Information (1972), Center for Public Management (1972), Iran Center for Management Studies (1971), College of Airhost Training (1974), Advanced School of Accounting and

Finance, National Iranian Oil Company (1957), International College of Administrative and Commercial Services (1976). Five faculties offer bachelor's and master's degrees in 25 fields of study.

Ahvas University of Medical Sciences, Ahvas, 1988 (Public-MHME). Previously the Faculty of Medicine of Shahid Chemran University (Ahvas), it is now independent.

Bakhtaran University of Medical Sciences, Bakhtaran, 1986 (Public-MHME). Previously the Faculty of Medicine of Razi University, it is now independent.

Bu-Ali Sina University, 1974 (Public-MCHE). Formerly Hamadan University. Hamadan College of Agriculture was amalgamated with this University in 1978. Four faculties offer associate diploma, and bachelor's degrees in 13 fields of study.

Bu-Ali Sina University of Medical Sciences, Hamadan, 1984 (Public-MHME). Previously the faculty of Medicine of Bu-Ali Sina (Hamadan) University, it is now independent.

University of Defense Industries and Sciences, Esfahan, 1986 (Public-Organisation of Defence Industries). A new university. Bachelor's degrees in five fields of study.

University of Esfahan, Esfahan, 1949 (Public-MCHE). Six faculties offer bachelor's, master's, and Ph.D. degrees in 28 fields of study.

University of Emam Hussein, Tehran, 1986 (Public-Ministry of Pasdaran Militia and MCHE). First established as Emam Hussein Higher Education Center, it assumed university status in 1988. It is open to members of Pasdaran Militia. For nonmembers, the maximum age of admission is 23. Four faculties offer associate diplomas and bachelor's degrees in 28 fields of study.

University of Eman Sadeq, Tehran, 1983 (Private). A new university, it offers a six-year course which leads to a master's degree (*karshenasi-arshad payvasteh*) in three fields of study. It specializes in Islamic studies.

Esfahan University of Technology, Esfahan, 1976 (Public-MCHE). Originally established as a campus of Arya Mehr University of Technology, it was renamed in 1983. In 1980 the Esfahan College of Work and Vocation was amalgamated with this University. Ten faculties and one affiliated college offer associate diplomas, bachelor's, and master's degrees in 26 fields of study.

Esfahan University of Medical Sciences, Esfahan, 1986 (Public-MHME). Previously Faculty of Medicine of Esfahan University.

University of Ferdowsi, Mashhad, 1949 (Public-MCHE). First founded as Razavi University, in 1958 it was renamed Mashhad University and in 1974, Ferdowsi University. Seven faculties offer associate diplomas, bachelor's, and master's degrees in 63 fields of study.

University of Gilan, Rasht, 1974 (Public-MCHE). Founded following an agreement between the Iranian and West German governments, the agreement was repealed in 1979 and the University began independent operations. In 1983 Rasht College of Commerce and Gilan College of Management were amalgamated with this University. Five faculties offer bachelor's and master's degrees in 19 fields of study; two affiliated colleges offer associate diplomas only.

International Islamic University of Iran, Ghazvin, 1983 (Public-MCHE). The latest information (1989) indicates that this University is still in the process of formation. It offers associate diplomas, bachelor's, master's, and Ph.D. degrees in Islamic studies only.

Iran University of Science and Technology, Tehran (Narmak), 1930 (Public-MCHE). First founded in 1930 under the jurisdiction of the Ministry of Commerce, Vocation and Art, in 1954 it came under the jurisdiction of the Ministry of Industries and Mines, and in 1960 the Ministry of Education assumed responsibility. In 1971 it was renamed The College of Science and Technology, and assumed its present name in 1980. Nine faculties and an affiliated college offer associate diplomas, bachelor's, and master's degrees.

Khajeh-Nasir-al-din Tusi University (Engineering and Technology, Tehran, 1979 (Public-MCHE). First founded as Engineering and Technical Group, following amalgamation of eight colleges in 1985, it was renamed Technical and Engineering University and in 1988 assumed its present name. The eight colleges which formed this university were College of Communications (1967), College of Cartography (1964), Water Institute of Tehran (1969), Technicon Institute of Tehran (1973), Technical College (1976), College of Construction (1972), University of Work and Vocation (1975), University of Technical Sciences (1977). Four faculties offer associate diplomas, bachelor's, and master's degrees in 14 fields of study.

University of Mazandarun, Babolsar, 1977 (Public-MCHE). First established as Reza Shah Kabir University, it offered only Ph.D. degrees in anthropology and chemistry. In 1983, it was renamed and four colleges were amalgamated with this University: College of Agriculture, Sari (1972), College of Economic and Social Sciences, Babolsar (1970), College of Forestry, Gorgan (1974), Technical College, Babol (1974). Five faculties offer bachelor's and master's degrees in 19 fields of study and an affiliated college offers associate diplomas only.

Mashhad University of Medical Sciences, Mashhad, 1986 (Public-MHME). Previously Faculty of Medicine of Mashhad University.

University of Payam Nour, Tehran, 1987 (Public-MCHE). In 1980-81, the two universities providing distance education in Iran, Aburayhan Biruni and Azd were amalgamated with Literature and Humanities University Complex. After the formation of Allameh-Tabatabie in 1984, and the amalgamation of Literature and Humanities University complex with this University, Payan Nour University was established in 1987 and provided distance education only. It began admitting students in 1988. Its central campus is located in Tehran, and it has 29 campuses throughout Iran. It offers associate diplomas and bachelor's degrees in 10 fields of study.

Police University, Tehran, 1953 (Public-MCHE). It assumed its university status in 1979. Offers bachelor's degree of three-and-a-half years' duration.

University of Razi, Bakhtaran, 1972 (Public-MCHE). Three faculties offer bachelor's degrees in 10 fields of study; two affiliated colleges offer associate diplomas only.

University of Sistan & Baluchestan, Zahedan, 1975 (Public-MCHE). Four faculties offer bachelor's degrees in 11 fields of study, and one affiliated college offers associate diplomas.

University of Shahid Bahonar, Kerman, 1975 (Public-MCHE). First established as University of Kerman, renamed in 1983. College of Commerce and Business Administration, Kerman, was amalgamated with this university after the Revolution. Six faculties offer associate diplomas, bachelor's, and master's degrees in 26 fields of study, and an affiliated college offers associate diplomas only.

University of Shahid Beheshti, Tehran, 1960 (Public-MCHE). First founded as National (Melli) University of Iran which remained a private institution until 1979, it was renamed in 1983. Twelve faculties offer associate diplomas, bachelor's, and master's degrees in 49 fields of study.

University of Shiraz, Shiraz, 1949 (Public-MCHE). Twelve faculties, six affiliated colleges and four research centers offer associate diplomas, bachelor's, master's, and Ph.D. degrees in 48 fields of study.

Sharif Industrial University, Tehran, 1965 (Public-MCHE). First founded as Arya Mehr University of Technology, it was renamed in 1983. Ten faculties offer associate diplomas, bachelor's, master's, and Ph.D. degrees in 38 fields of study.

Shahid Beheshti University of Medical Sciences, Tehran, 1983 (Public-MHME). Previously Faculty of Medicine of Shahid Beheshti University.

University of Shahid Chemran, Ahvaz, 1955 (Public-MCHE). First established as University of Jondi Shahpur; renamed in 1983. Ten faculties, two colleges and five affiliated research centers offer associate diplomas, bachelor's, master's, and Ph.D. degrees in 53 fields of study.

Shiraz University of Medical Science, Shiraz, 1984 (Public-MHME). Previously Faculty of Medicine of Shiraz University.

University of Tabriz, Tabriz, 1947 (Public-MCHE). In 1977 it was renamed Azarbadegan University, then Tabriz University again after the Revolution. Six faculties offer bachelor's and master's degrees in 43 fields of study. Three affiliated colleges offer associate diplomas in animal husbandry and agriculture.

Tarbiyat Moelem University (Teacher Training University for secondary school teachers), Tehran, 1919 (Public-MCHE). First established as a teacher training center; in 1933 it offered tertiary degrees, when it was named as a *daneshsari-ali.* In 1975 it assumed university status.

In 1980 a number of colleges were amalgamated with this university, including Arak College, Kashan College, Pars College, Karaj College (mathematics branch only), and College of Physical Education. Some of these colleges were later amalgamated with other institutions. Five faculties and six provincial affiliated colleges offer bachelor's, master's, and Ph.D. degrees in 35 fields of study.

Tarbiyat Modarass University (Teacher Training, tertiary-level teachers only), Tehran, 1982 (Public-MCHE). First established as a college and elevated to a university in 1986. Six faculties offer master's degrees in 73 fields and Ph.D. degrees in 25 fields of study.

University of Tehran, Tehran, 1934 (Public-MCHE). Fourteen faculties offer associate diplomas, bachelor's, master's, and Ph.D. degrees in 204 fields of study. It also has a number of affiliated education, teaching and research centers.

Tabriz University of Medical Science, Tabriz, 1984 (Public-MHME). Previously Faculty of Medicine of Tabriz University.

Uramyieh University, Uramyieh, West Azarbaijan, 1965 (Public-MCHE). First established as a college of agriculture and animal husbandry. Until 1977 it was known as University of Rezaieh. Four faculties offer associate diplomas, bachelor's, and doctorate (veterinary medicine) in 16 fields of study.

Uramyieh University of Medical Science, 1983. (Public-MHME). Formerly Faculty of Medicine of Uramyieh University.

Yazd University, Yazd, 1987 (Public-MCHE). A new university, offering bachelor's degrees in the field of civil engineering.

See also the listing of MHME Universities.

Complexes and Higher Education Centers

Art University Complex, Tehran, 1980 (Public-MCHE). Established following the amalgamation of the following six colleges: College of Decorative Arts (1964), College of Dramatic Arts (1964), Advanced School of Music (1960), National Music Art Center (1956), Farabi University (1975), Pardis College, Esfahan (a branch of Farabi University). Consists of six divisions and an affiliated college in Esfahan. It offers bachelor's degrees in 14 fields of study.

Higher Education Complex of Birjand, Birjand, 1975 (Public-MCHE). First established as College of Shokatieh; renamed in 1976. It offers associate diplomas and bachelor's degrees in 10 fields of study.

Higher Education Complex of Zanjan, Zanjan, 1974 (Public-MCHE). First established as Zanjan Agricultural college, it was renamed in 1977. It offers associate diplomas and bachelor's degrees in three fields of study.

Higher Education Complex of Dehkhoda, Ghazvin, 1975 (Public-MCHE). Established following the amalgamation of the College of Economic and Social Sciences and College of Ghazali under the title of Ghazvin Higher Education Complex; until 1978 it was affiliated with the University of Tehran. In 1979 it became independent and assumed its present name. Two divisions offer associate diplomas and bachelor's degrees in five fields of study.

Higher Education Complex of Shahrood, Shahrood, 1974 (Public-MCHE). First established as Shahrood College of Mining, offering associate diplomas only. In 1987 it assumed its present name when it began to offer bachelor's degrees. It offers associate diplomas and bachelor's degrees in six fields of study.

Higher Education Center of Loreston, Khoramabad, 1979 (Public-MCHE). First established as part of the University of Shahid Chemran; it became independent in 1983. It offers bachelor's degrees in two fields of study.

Higher Education Center of Economic and Financial Services, Tehran, 1988 (Public-Ministry of Economics and Financial Affairs). A new institution, it offers associate diplomas and bachelor's degrees in six fields of study.

Higher Education Center for Ideological-Political Training, Qum, 1987 (Public-Pasdaran Militia). A new institution, it offers bachelor's degrees.

Higher Education Center for Accounting, Tehran, 1988 (Public-Ministry of Petroleum). A new institution, it offers bachelor's degrees in accounting.

Higher Education Center for International Relations, Tehran, 1983 (Public-Ministry of Foreign Affairs). A new institution, it offers bachelor's degrees in international relations.

Higher Education Center for Navigation, Noshahr, 1980 (Public-IRI Army). A new institution, it offers bachelor's degrees in three fields of study.

Higher Education Center for Air Forces, Tehran, 1987 (Public-IRI Army). A new institution, it offers bachelor's degrees in four fields of study.

Colleges. See also the listing of MCHE colleges.

College of Officers Corps (Ground Forces), Tehran, 1921 (Public-IRI Military). First established as a postsecondary school offering two-year courses, it assumed its present status in 1938 when it began to offer bachelor's degrees in two fields of study.

College of Voice and Vision of the Islamic Republic of Iran, Tehran, 1969 (Public-MCHE). First established as College of Television and Cinema offering associate diplomas only; in 1973 it began offering bachelor's and master's degrees. It was renamed in 1983, and offers associate diplomas and bachelor's degrees in two fields of study.

College of Judicial Law and Administrative Services, Tehran, 1983 (Public-MCHE). A new institution, it offers bachelor's degrees in two fields of study.

Abadan College of Petroleum, Ahvaz, 1939 (Public-Ministry of Petroleum). First established as a technical college offering associate diplomas and bachelor's degrees. In 1959 it was renamed Abadan Institute of Technology and resumed its original name after the Revolution. With the outbreak of the war in 1980, it was closed for a time, then transferred temporarily to the University of Shiraz. It is now located in Ahvaz and offers bachelor's and master's degrees in seven fields of study.

College of Judicial Law of Qum, Qum, 1979 (Public-MCHE). A new institution, it offers bachelor's degrees, four-and-a-half years in duration, in the field of Islamic judicial law.

Semnan College of Technology, Semnan, 1973 (Public-MCHE). Offers associate diplomas and bachelor's degrees in nine fields of study.

College of Shahid Motahara, Tehran, 1969. First established as Sepahsalar College offering bachelor's degrees in Islamic studies; it was renamed in 1980. It offers bachelor's degrees in two fields of Islamic study.

Source: *Country Profiles.* Iran, Nooshin Guitoo, Ph.D. 1991.

Appendix B

The following information was supplied by the Department of Scientific Cooperation and International Relations of the Ministry of Health and Medical Education.

Admission to all programs is based on the general entrance examination.

Associate Diploma (A.D.), 2 years.

Dental Prosthesis Technician
Dental Nursing
Oral Health Technician
Speech Therapy*
Prosthetics*
Medical Documentation*
Audiometry*

Associate Diploma (A.D.), 2.5 years.

Nursing
Midwifery
Nutrition
Anaesthesia Technician
Operating Room Technician
Occupational Health
Environmental Health
Public Health
Radiology
Radiotherapy

* Graduates of these two-year programs and graduates of all two and one-half year programs may go on to a further two-year program leading to a B.Sc. (Discontinuous) or a five-year M.Sc. (Discontinuous)

Bachelor of Science, 4 years. (Continuous)

Nursing
Nutrition
Food Sciences and Technology
Physiotherapy
Ergotherapy
Hospital Administration
Midwifery
Prosthetics
Optometry
Audiometry

Speech Therapy

Graduates may go on to a two-year program leading to an M.Sc.

Professional Doctorate, 6 years.

General Medical Doctorate (M.D.)
General Dentistry Doctorate
General Pharmacy Doctorate

Specialization following these degrees is three to five years in medicine, three to four years in dentistry, and three to four and one-half years in pharmacy.

Universities of Medical Sciences authorized by the Ministry of Health and Medical Education.

Tehran	Iran	Shahid Beheshti*
Ahvas*	Bukhtaran*	Gilan
Shiraz*	Zahedan	Mazandaran
Esfahan*	Kerman	Zanjan
Mashhad*	Uramyieh*	Semnan
Tabriz*	Bo-Ali Sina*	Arak
Shaid Babaee Ghazvini	Bandar Abbas Shahid	Sadooghi of Yazd

*These universities are listed in Appendix A.

Colleges of Medical Sciences.

Ilam	Jahrom	Fasa
Birijand	Babol	Kashan
Yasuj	Bushehr	Lorestan
Sabzavar	Sanandaj	Gonabad

The Ministry offers courses in 68 medical specialties.

Optical Scanning from Admissions to Grading

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Optical Mark Readers (OMR) were developed in the 1950s for scanning purposes and were originally used to process forms for multiple choice tests, still the most widespread and best known use of this technology. This paper examines the changes that have occurred in OMR technology, provides an overview of OMR components and technical considerations, discusses the application development process and forms design, identifies associated advantages and disadvantages, highlights key applications in use at colleges and universities, and assesses the potential for other uses of scanning in higher education.

Technological Improvements

Optical Mark Reading has been used in higher education for many, many years. It is important to revisit this technology because, as with other electronic innovations, there have been many improvements in the hardware and accompanying software that have added flexibility to application development. Equally important, the cost has come down. Scanners range in price from $2,000 on the low end for devices with limited capabilities, to $75,000 for machines with speed and technological features that can address the high-volume, complex application needs of the most sophisticated user. Some vendors will provide small readers free of charge when customers agree to buy a minimum number of forms.

Essentially, OMR technology involves reading pencil marks on the form, converting those marks into digital data, and finally transmitting parallel construction of this information to the computer. It eliminates the keystrokes required for operator data entry or the tone signals produced by touchtone telephones. It is a viable alternative, especially for alpha data collection as compared to voice response technology. The source document is the input document. Eliminating the task of manual transcription eliminates the possibility of keying data incorrectly.

OMR technology is most commonly used when there is only one right answer; in other words, when the information is alpha/numeric and all the choices are given (A–Z or 0–9), or when a single choice is made from a set of options. More recently, software has been developed that allows for more than one right answer. Major vendors now have software that allows for certain defined relationships between fields as well as the possibility of multiple right answers. This has been an important development in OMR technology and has resulted in more versatility than ever before for such things as tests and surveys.

This technology is most effective for handling large volumes of data. In admissions and records, OMR is commonly used for large volume tasks requiring almost immediate processing, such as scheduling courses during registration or processing final grades at the end of the semester. It offers the ability to process multiple forms individually or via an automatic form feeder at a rate of up to 10,000 forms per hour and up to four different forms at the same time.

OMR manufacturers have made use of two types of technology to read a form. One is trans-optic and the other is reflective. Trans-optic requires a transparent paper that allows a machine with one read head to scan marks on both sides simultaneously in one pass by reading "through the form." With recent improvements in read heads, feed paths, processing speeds, etc., the dominant technology used today is reflective. With this process, the OMR machine reads one side of the form by sensing the bubble and reflecting a signal to the microprocessor in the read head, which is then interpreted by the machine. If the application and design of the form require that the machine read both sides of the form at the same time, then a second read head must be present in the machine. The advantages of reflective read heads include lower cost for forms and more flexibility in form layout and design.

Perhaps the most significant improvement in OMR technology for administrative solutions in higher education is the ability to interface the scanner with the personal computer (PC). PC-based software has been developed to simplify application development, editing of the data, control of the scanner, management of the data read, and communications with the mainframe host.

In the last several years, developments in microprocessors and fiber optics have given rise to OMRs with greater capabilities and more flexibility. The most significant recent advancement is the addition of capabilities to recognize and read a batch of mixed forms by identifying each form as different and processing the information accordingly. Then the reader generates a digital record that can be used directly by database software packages such as dBASE III, Lotus 1-2-3, SPSS, and Paradox.

OMR Components

The basic components that make up an OMR platform include the read head, document transport, processor control, and, in some cases, software tools. Depending on your application needs, other options that may be ordered on some of the smaller machines are bar code readers, transport printers, and additional disk storage. Most of these options may be field installed after initial delivery if a new application requires one of these features.

Reflective read head sensitivity improvements allow for up to 16 levels of discrimination and enable the machine to distinguish between intended and invalid marks such as incomplete erasures and smudges. The 16-level mark evaluation is considered the industry standard. Today's technology also includes automatic calibration of the read head versus the old manual process of adjusting sensitivity. Ink read heads are now an option, but there are form color limitations.

The document transport may be a single sheet, handfeed model or input and output hoppers capable of processing from 300 to 500 multisheets automatically. Some machines also have an alternate output hopper that supports the automatic sorting and ejection of problematic

forms for later resolution. Many new machines of the type that might be used in lower volume office applications incorporate an open feed path design which decreases the possibility for jams and reduces the manual operator effort to remove the form should an occasional mishap occur.

Processor control of the scanner can be accomplished using programmable switches on the scanner itself for more simplistic applications, or managed via PC or mainframe software. Typically, scanners have an alpha/numeric character display on the machine to communicate error messages when programmable switches are used for control purposes. This feature is not as important when the device is being driven by PC software interfaced with the scanner.

In addition to standard processor management software, some companies also provide application development, forms design, editing, and statistical software packages that can be used on a PC in combination with the scanner. The availability of these software options has changed OMR applications development from a process that was once considered labor intensive and measured in weeks or months to what is now considered a user-friendly process that takes only minutes or hours to complete. The cost of these software packages varies between $500 and $1,000 depending on the vendor and functional features. It is also important to know the minimum PC specifications to run scanner-related software (for example, IBM AT-compatible, DOS 3.1 or higher, etc.).

Depending on application needs, there are other OMR options to consider. Some vendors offer the ability to read bar code, Optical Character Recognition (OCR), and OMR data from one form and merge the data into a single output record. Transport printers can be added to allow printing of control information such as batch numbers, error messages, or number of right and wrong answers. With added application possibilities, disk storage capacity may become an issue; therefore, expansion options should be evaluated.

Steps in the Application and Admissions Process

The first step in applying OMR technology is to design the form. Standard forms exist and are reasonably priced; however, for the purpose of this discussion, it is assumed that the OMR "solution" will require a custom-designed form. Many elements which are part of a successful scannable form are the same as for any office form.

Designing the Form

Aesthetics. The form must look good. Shading, white space, reverse colors, and the form color are all elements that must be considered.

Format. The entry of data should follow a logical course. The scanner can produce an output record in a format different from the scan order, so the form should be designed with the respondent in mind.

Completeness. The form should be easily updated if requirements or policies change. As an example of this, one application for admissions form has some undefined scannable spaces in the "for office use" block that have allowed institutions to address different categories of students as the need arises.

If you have the impression that OMR forms are somewhat limited, think again. Forms are not just available in the single cut sheet format. There are continuous sheets, folded booklets, up to eight-page glued book presentations, multipart forms with carbons, and color options. While vendors provide assistance with custom designed forms layout, it is advisable to review as many samples as possible for ideas and planning purposes. Forms design software packages allow for inhouse development of forms printed on laser printers. This option avoids initial set-up costs which can be $500 to $600 or more and, for low volume applications, reduces the unit cost per form significantly. The initial expense of the software can be quickly recovered.

Defining the Form

When an OMR "reads" a form, it determines which of the mark positions on the form have been marked and which have not. This information is organized by mark position location as defined by the line and column of the mark position. As an example, the machine establishes that the mark position at line XX and column YY has been marked. Considering that the OMR does not read any graphics or typeset materials on forms, it has no knowledge of the meaning attributed to this particular mark position.

The form information represented by a mark position must be translated into a data record that can be used by a computer application program. Scanners can now do the forms translation within their own microprocessors so data transmitted to the computer is already in the record format required by the application program. To activate the forms translation, the OMR is given a description of the form in terms of the type of information to be obtained from the form and the location of blocks of information designated by mark positions. Basically, the form definition describes how the mark information will be translated and the format of the computer record generated as each form is read.

Forms are described in terms of the type of data, the location of the data on the form, and how the mark data should be translated to the record. The blocks of information are referred to as data zones. A data zone can be vertical or horizontal, or its elements can be randomly distributed on both sides of the form. A data zone can be illustrated by a nine-digit social security number. In this example, the block or data zone would consist of nine lines of mark positions, and each line would have ten mark positions labeled "0" through "9." Because the person filling out this data block has a choice for each digit from 0 to 9, these types of zones are called multiple choice zones. If the social security number to be entered was 338-84-2345, marks would be made in the "3" position of the fourth line and so on to the "5" position on the ninth line. Similarly, a 20-line block of mark positions with each line having 26 mark positions labeled "A" through "Z" could be used to enter a last name with up to 20 characters. Consideration should also be given to handling alpha data with hyphens and apostrophes.

OMR Advantages

The advantages of optical scanning at colleges and universities are numerous. This section will focus specifically on advantages to the Registrar and Admission Offices.

High Speed Data Entry

Depending on the make and model, and OMR can process from 1,200 to 10,000 sheets per hour. If there are 250 marks per sheet, this would equal 300,000 to 2,000,000 key entry strokes per hour. At best, it is estimated that an experienced data entry operator can enter approximately 15,000 key strokes per hour, thereby processing only 40 sheets of comparable data in the same amount of time. One high speed scanner will usually match the input of 20 key entry clerks. Some scanners are capable of automatically reversing all mark positions on a form when it has been fed into the unit backwards, allowing for even greater efficiency.

Increased Accuracy

OMRs will only scan marks which are properly filled in on the appropriate form. Although some of the disadvantages we will discuss later are related to the learning curve and error rate of the person completing the form, the opportunity for data entry operator error is virtually eliminated. Errors in key strokes are not a problem, and, in general, the staff do not feel so pressured to "get the job done," which reduces errors made in haste.

Increased Productivity of Staff

Staff are now free to do other tasks and provide a higher level of customer service since they are relieved of a large volume of straight data entry. They can spend valuable time auditing the records, verifying residency, evaluating transcripts, and performing other duties that cannot be automated as easily. With students essentially doing their own data entry, the office staff can operate more efficiently, and students are more likely to "own" their errors.

Timely Report Generation

"Accountability" is increasingly important. It is essential that registrars and admissions officers be able to access accurate and complete student information very early in the semester. With OMR, edits can be run earlier and with greater accuracy, thus leaving less work to do before producing final reports.

Simplified Staff Training

Most institutions rely on a number of temporary staff for registration and other specific office functions. With optical mark scanning, data entry staff do not have to know the intricacies of what piece of information goes in which field. Scanning the majority of the information allows managers to devote training time to the really important issues rather than to the details that only more experienced workers can be expected to handle.

Direct and Indirect Savings

Direct savings refer to actual dollar savings, while indirect savings result in more timely processing and reporting as well as more staff satisfaction.

Disaster Preparedness

With the advent of OMR devices attached to PCs, it is feasible to include this method of offline data collection in strategic disaster preparedness and recovery plans. After periods when host communications have been disrupted, PC files that have been created from scanned documents can be uploaded to the mainframe for batch maintenance processing.

OMR Disadvantages

Learning Curve for Students and Staff

As with anything new, it takes some time for people to adjust to it. Some students are more familiar and comfortable with technological advancements than others. Some students, usually the more traditional college students, are more accustomed to using scannable forms than others. Providing students with clear, concise instructions is essential and can reduce the time it takes for students to feel comfortable with the process. In addition to the learning curve for students, there is definitely a learning curve for staff. As staff become more familiar with the form, it is easier for them to spot errors and have them corrected before actually scanning the form. Although this is not necessary, it does speed up the process and reduce the drain on computing resources.

Error Rates

Built-in edits and validations are essential. Students will make mistakes that are very difficult to detect through visual review of the form. The computer can be relied upon to identify errors or invalid data.

Quality Control of Forms

All the optical scanning forms in the world will not speed up the data entry process, reduce the error rate, or simplify staff training unless the OMR machine can process the form. A timing mark that is off by 1/10,000th of an inch can be critical. Significant progress has been made in read tolerance levels, but the quality of the printing can still be an issue. Depending on the equipment, forms can be perforated, folded, and even completed in ink; however, the printing is crucial. Most forms for high volume applications cannot be reproduced inhouse due to the sensitivity of the timing marks. Paper quality must be controlled, and many forms require custom design. Poor quality control of forms results in printing errors that can be detrimental to the process.

Equipment Sensitivity

An electronic device subject to moving, hauling, or relocation must be properly handled. Vendors will advise you to put OMR machines back in their original packing and pack the read heads before moving them. As with any other piece of equipment that makes use of a myriad of electronic components, contingency plans need to be in place in case of unforeseen technical problems. If there are multiple machines on campus, the solution may be as simple as having a backup identified and ready to move into place.

Uses of OMR in Higher Education

The following lists possible uses of OMR technology in two-year, four-year, public, and private institutions in higher education today. Imagination is the only limiting factor.

Test scoring	Biographical data collection
Faculty evaluations	Research
Assessment	Accreditation self-study
Time sheets/leave forms	Admissions
Registration	Centralized drop/add
Parking	Housing and meal plans
Payment plan selection	Yearbook sales
Grade reporting	Unlimited special uses

In the remainder of this article, specific admission and records application in use at Collin County Community College and the University of North Texas will be presented.

Application for Admission

The Collin County Community College District has been using Scantron equipment in the testing center since 1986 but purchased a model 8200 at a cost of approximately $5,000 in 1989 for dedicated use by the Admissions Office. Features of this model include reflective read, the ability to read both sides of the form simultaneously, and the ability to accommodate six lines per inch with 48 spaces per line, a critical issue for a complex form like the application for admission.

The District currently has two campuses, and the first machine was utilized exclusively at the larger of the two in an effort to handle enrollment growth in double digits. In each of the past three years approximately 9,000 to 10,000 applications have been processed; however, until recently nearly 1/2 of them came in during regular registration. This is a common problem for community colleges.

Until fall 1992, applications were processed from a longhand version of the application for admission at the second campus. In September 1992, a slightly used Scantron 8000 was purchased so that both campuses would be procedurally alike. The main differences between the 8200 and the 8000 are the speed of the scanner, the input hopper, and the memory capacity. Both machines have reflective read capability. The 8000 is capable of auto feeding up to 250 forms; however, the college opted for single sheet feed rather than batch processing. As each application is scanned, an ASCII text file is created which is sent to the VAX. The VAX receives the actual text file just as if an operator had entered each keystroke. SCANBOOK, software developed by Scantron, was used by the computer services department for forms translation to the mainframe.

In addition to the Scantron equipment, a dedicated port is required, primarily because the communication link must be 4800 baud. The machines are connected to a computer terminal with access to a VAX 8800. These terminals can be used for other purposes but must be logged out of the scanning application and logged into another program to do so. Typically, the terminals are more or less "dedicated" to the scanner as a result.

The user defined edits were probably the most technically complex part of the installation and are definitely the key to successful processing of admission applications. Basically these edits perform a series of checks on each application. The computer verifies that all necessary items are completed with an "acceptable" alpha or numeric character or combination of characters. Any discrepancies create a specific error message to which the operator responds. As the staff have become more proficient at using the form, they are able to spot and correct (or give the form to the student to correct) many errors before the forms are scanned. The final step in this edit process is to have the terminal display the student's name, social security number, and local address with a prompt to accept or reject the application. Since these three pieces are critical to our ability to locate and identify a student, the operator verifies their accuracy and responds accordingly.

Advantages. By combining the OMR solution of application processing with telephone registration, the number of days required for regular arena-like registration has been dramatically reduced from 22 to seven days per year. The college has also been able to considerably reduce the number of temporary staff required as well as the length of time they must be retained after registration for clean-up purposes. The savings are estimated to be $2,400 per registration period or approximately $7,200 per year at Collin County Community College. The savings may even be greater since additional fulltime staff can process applications with approximately 450 fewer man hours.

Indirect savings came as somewhat of a bonus. First, there was an impact in the area of state report clean up. The time spent to get all the data ready for certification to the state was significantly reduced. What had taken over three weeks to complete prior to using the OMR equipment was finished in two days, thus testifying to the improved accuracy of the data collected. The second surprise could be described as "office pride." The staff now see themselves as innovators. In the past three years, the Collin County Admissions Office has been visited by registrar and admissions officers from two-year, four-year, public, and private colleges and universities. Each time someone comes for a visit, the staff is actively involved with the demonstration. They enjoy "showing off" how the system works and take pride in doing so.

Other OMR Uses at Collin County. Although the college had been scanning grades and instructor evaluations for several years, the fact that readers are now available in the Admissions Office has opened up additional possibilities for scanning. A biographical data form has been designed to capture information related to special populations in the admissions process. The most recent application of OMR technology is being introduced in the Human Resources Office where staff will begin scanning time sheets and leave forms this year.

Registration and Drop/Add

In fall 1984, the University of North Texas installed the Information Associates' student information system and went live with an OMR batch early registration, online OMR registration, and centralized OMR add/drop processing. The OMR batch early registration process was replaced by Teleregistration in fall 1988. Initially, four National Computer Systems (NCS), Inc. 7000 machines, rated at 300 sheets per hour, were purchased at a cost of about $12,000 each to support OMR registration processes. This equipment has recently been replaced with NCS OpScan Model 5s rated at 3,000 sheets per hour and costing about $4,500 per unit. Each OpScan 5 is attached to a PC running ScanTools for application control

purposes. The PCs have ASC 3274 bisynchronous boards with NCS software installed for scanner/host communication purposes. Existing PCs in the office were used rather than newly purchased dedicated devices.

The on-line registration process is simple. Students enter the Coliseum and review the open section board reports that provide information on the number of seats remaining in each class or closed status. Students then follow the instructions printed on the back of the OMR form and complete their course request selections. There are eight course request blocks on the form, and two of the eight can be used for alternate courses should any one of the other course selections not be available. Students bubble in their social security numbers and the term for which they are registering and submit the forms to a scanner operator. The sheet is processed, and the student is directed to one of two Telex 387 printers located approximately 45 feet from the scanners. The student's name is called, and a complete copy of the schedule with course status comments is handed to the individual. Error messages such as time conflicts, unknown course, closed sections, etc., are noted on the schedule printout.

If the student has one or two course errors, he or she may step to one of eight scheduling terminals for assistance. If there are more than two errors, the student must return to the open section boards and resubmit the OMR course request form. The original form can be reprocessed with additional courses or a new form can be completed for subsequent submissions.

The same OMR course request form for registration is used for drop/add, which decreases the unit cost per form significantly. The schedule change process is identical to registration. The same course request form also supports other functions related to registration and drop/add. Students can request a yearbook, select parking options and a deferred payment plan. By marking the appropriate bubble, these selections will be noted on the student's schedule and automatically calculated into the tuition statement.

Advantages. In 1984 the cost benefit analysis netted a $5,000 per year hard dollar savings based on the four scanners being equivalent to four Telex 286 eight port 3270 controllers with 28 attached terminals, for a total of 32 work stations. With current OMR equipment options and costs, the savings would be even greater today. Another major advantage was the soft-dollar savings associated with not having to recruit, hire, and train 32 terminal operators. The training of the scanner operator is a simple process compared to training terminal operators unfamiliar with student scheduling. With students assuming the responsibility for course selection and the OMR data entry functions, the transition to touchtone for early registration in 1988 was a natural process.

In retrospect, it is clear that the centralization of the drop/add function would not have been possible at North Texas without the use of OMR scanners. In a period of three days of drop/add in a long semester, approximately 25,000 schedule changes are processed via OMR forms.

Grade Reporting

The processing of grades with OMR at North Texas originated on an IBM 1230 which was replaced by an NCS 7001 in 1984. Current equipment used for grade reporting is the NCS OpScan Model 7, which was purchased in 1992 at a cost of about $15,000. This model is

rated at 50 sheets per minute and is equipped with dual read heads, a transport printer, and an alternate output tray for documents that need operator attention. The grades are collected in a batch ASCII file on an attached PC and then transferred via a gateway to the mainframe computer for processing.

The OMR grade sheet is a multipart carbonless, continuous feed, pre-slugged form with control information that uses an impact printer. The control number is read by the OpScan 7 for file audit purposes when each sheet is processed. Instructions for completing the form are printed on the back of each of over 6,000 printed grade sheets. Approximately 60% of the grade sheets are returned within two hours of the deadline, which is 24 hours after the last final exam.

Advantages. About 4,000 grade sheets are processed over a six-hour period by one operator as compared to the many extra person hours that would be necessary to enter them online. Errors are quickly resolved by correcting and resubmitting a grade sheet or updating the data online. As a result, over 125,000 grades are ready to be mailed to almost 27,000 students within 48 working hours after the last final exam.

Other OMR Applications at North Texas

It was the successful use of OMR for grade reporting that caused other applications to evolve at North Texas. These include exam test scoring, research, faculty and instructional evaluations, assessment, and, of course, registration and drop/add. These applications were developed before OMR reached the user friendly level of today's technology. In making the transition to the OpScan 5 and 7 machines, in excess of 30 different applications were collapsed to seven more flexible programs with many more generic uses. Because it is much easier to develop and maintain new applications, and because software is available for inhouse design and production of forms, North Texas is evaluating other uses for OMR. Applications under consideration are address and biographical data changes, graduate admission applications, support for financial aid, and uses in the accreditation self-study process.

Summary

With the many changes and improvements in OMR equipment, especially during the last seven years, the use of this technology in higher education deserves to be revisited. Equipment costs have come down; software development and management tools now make OMRs more user-friendly; and forms design options, including development software and laser printing, are more flexible. While there are some disadvantages associated with OMR, potential cost savings, improved efficiency, and reduced work load benefits for staff are powerful advantages that scanning solutions can bring to your campus.

References

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Note: We wish to thank the above referenced companies for their input and review of the presentation for accuracy related to technical issues.

Higher Order Technology in Enrollment Services:
First the Destination, and Then the Path

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Introduction

Much of the application of technology in organizations is too myopic. The typical application development tends to occur in isolation. Technology itself is not the answer; it is only a tool. We must move from the myopic view to a broader system view of our organization for technology to really make a contribution. This article will focus on how systems such as on-line transfer credit evaluation, degree audit, registration, and transcript production can be developed to serve an expanded group of constituents.

Was Our View of Registration Too Narrow?

A few years ago, shortly after we implemented touchtone registration and were receiving affirmation from students and fellow professionals, I was in the presence of our vice president for financial affairs, Roger, patting myself on the back for a job well done. Actually, I was there asking for more funds to expand the system. I had at one time worked for Roger, and so I was quite comfortable letting him know that our touchtone registration system was garnering national recognition. Roger, wanting to help put my pride in perspective, said, "You know, registration isn't over until the student pays his fees."

"Registration isn't over until the student pays his fees." Those words stuck in my craw. Sure, we had some problems with fee payment brought on by our new mode of registration, but couldn't Roger see what an accomplishment touchtone had been? Surely he could see what convenience it afforded the students. If he only understood how complicated registration was!

When Is the User Always Right?

A few months ago two colleagues, SIS users from our business college, came to me with two wonderful ideas. They had already invested some time, and even programming, fleshing out the design of both applications to meet their needs. They were quite articulate about what they wanted.

Their first idea was a system that would produce acceptance letters to graduate applicants on a local laser printer. They proposed several variations of the letter which could all be preprogrammed based on operator input at the time of acceptance to the graduate program. Their

programmer had, in fact, already written a program with the predefined letter formats therein. All they needed from SIS was the capture of additional data elements to feed their program.
Their second idea held the potential for revolutionizing our interaction with students and prospects. It was a system to produce mailing labels in response to distributed inquiries. Any user could enter a prospect's request for a graduate application package. In other words, the user could key in the prospect's name and address, knowing that request would be serviced the next time the "owner" of the prospect labels initiated a batch to print. I was intrigued by the universal application of this principle across departmental and college boundaries. For example, a receptionist in the Music Department, responding to a telephone inquiry, could key in a request for an undergraduate application. The next time Undergraduate Admissions printed out a batch of requests, the Music Department's request would be among them. No longer would we need to refer inquiry calls or forward prospect names and addresses through interoffice mail.

My staff took the letter writer and the mailing label ideas and ran with them. We had been talking for years about writing a letter writer as a complement to our report generator. But as we considered the diverse needs a letter writer might satisfy, our model became more and more generalized and less and less specific to the business application. And rather than write a label generating a program exclusively for graduate business prospects, why not develop what we termed a "packet" system, where any office could define a destination to which inquiry packets could be routed? And why limit packets to producing mailing labels? Why not make it possible to link them not only to labels, but also to the letter-writer?

As we began to expand these ideas to solve a broader set of problems facing dozens of offices, our friends in the business college who had originated both ideas, quickly became impatient with the direction the project was taking. Their enthusiasm began to wane as they saw that we were broadening the scope of the project beyond their immediate problem. Suddenly, we were focusing on writing a generic solution, not on interfacing the solution they'd conceived. Their whole attitude toward the project soured. As they withdrew virtually all support for the project, I struggled to assess what I could have done differently.

Whose System Is This Anyway?

In my first year managing our financial programming group, I remember examining the month report that we distributed on green-bar paper to budget decision makers all over campus, a report called the Budget Status. After marveling at the cluttered style of the report, I remember thinking that it must surely be difficult for departmental budget administrators to base budget planning decisions on this document. I posed the question, "I'm sure that we'll be rewriting this report soon? Right?" One of those involved in the original design of the accounting system in 1971 responded, "It gives us the information we need."

Eleven years ago, I moved from the financial programming group to SIS. Since then we have implemented three new registration systems. Five years ago, all administrative applications migrated to an on-line database management system (DBMS). In SIS, we used that migration as an opportunity to totally rewrite our entire student system so that we might take advantage of the power of the DBMS. The budget status report, however, still has exactly the same format it had in 1971, except now you can view it on a CRT. When that report was migrated to on-line

display, was a budget decision maker outside the business office consulted? Knowing the business office's frame of reference, they probably did not consider that necessary.

There are many questions we need to address in registration today. How has your school capitalized on the revolutionary differences between a distributed database system and a Hollerith card system? What plans are you making to capitalize on the image technology that will be pervasive in the next generation of distributed database systems? Clearly, distributed access to documents can revolutionize our delivery of services, but only if we adapt the delivery. How often do we listen carefully to the feedback our systems provide? When we expend 80% of our effort to handle 20% exceptions, what is the system trying to tell us?

What Do We Want to Create?

Why do we adjust our frame of reference to 80 character card images, 132-column printouts, and 80 x 24 CRT displays, and then have difficulty conceptualizing a different world? And why do we perpetuate organizational structures and divisions of labor that were dictated by obsolete management principles or by the technology of 20 years ago?

It may be that we see our world differently. Each of us passes our daily experience through our own filter. It's as if we wear special glasses and see certain things more clearly and other things not at all. We call this filter, this frame of reference, our paradigm. It is the way we see things, the way we make sense of our world.

Our paradigm helps our mind process and make sense of millions of sensory inputs. It enables us to recognize familiar patterns and to filter out extraneous inputs. But that same paradigm may cause us not to see useful and relevant information. In the days of Galileo, it was the Aristotelian paradigm of an earth-centered universe that made it impossible for church leaders to see the obvious evidence Galileo presented. They simply could not see it, because it was inconsistent with their way of seeing the world.

There are many lessons we can learn from paradigms. First. if I want to be open to improvement in my organization, I must begin by recognizing my own subjectivity. Second, we perpetuate obsolete practices and structures because we find comfort in viewing systems in isolation—as if the inputs and outputs are not our concern, but are givens.

I use the word "system" in its classical sense: the orderly collection of parts into a rational and connected whole (note the classical "system" is distinguished from the "EDP system"). The system within an organization consists of processes, inputs, outputs, and the human beings who will the process to occur. I use the word "comfort" because it is comfortable to believe we deal with a finite world. To admit that the system is larger than my understanding is troubling. But I pay a price when I expend tremendous effort to make my province more efficient and never ask questions like, "Who are my customers? How might I better provide for their needs? Who are my suppliers? How might I work with them to improve the output of my own process?" Instead, too often, I place blame. I say, "That's their problem," and, in doing so, rule out the possibility of improving the performance of the system across departmental boundaries. In a nutshell, I don't recognize my organization for what it is, a system.

We are content to solve problems, rather than to ask, "What is it we want to create?" As a result, we use potentially liberating technology to build barriers within organizations. We bring incredible resources—hardware, software, bureaucracies-to bear on sub-optimal solutions. You know what those are. They're the kind where you win and I lose; or, if I'm designing the solution, I win and you lose. While I am still proud of Georgia State's pioneering effort in touchtone registration, I now recognize that in its first four years of use at GSU, it was a classical sub-optimal solution. We made it easy for students to register without making a trip to campus, but left fee payment predicated on the student's physical presence. It was like we had designed a super highway as if with a footpath exit at the end.

As long as our focus is on problem solving, we are focused on "how." It is not until we shift our focus to "what" that we make substantive changes to improve our systems. I see a presentation on an exciting new technology and immediately my wheels are turning. "How can I exploit that technology?" "Wouldn't that be impressive if we could pull that off at GSU?" Where is my focus? Is it on what is best for my institution or what is best for my resume? We become distracted from the ultimate questions of leadership by the seductive "how" questions of problem solving: "How do we implement touchtone in our environment?" "How much will this new technology cost?" "How long will this project take?" None of these are strategic questions; they are tactical ones. These questions and their answers are useful only after we have asked and answered the ultimate questions of directions and purpose—the "what" questions: "What do we want to create?" "What do our customers want from us?" "What is the scope of the system?" "What is our mission?"

It is because we fail to empower our workforce—those in a position to know what it is about—that the system stands in the way of their doing a good job. We fail to recognize the potential of the frustrated records clerk to help us improve the system, to show us where procedures no longer make sense. We fail to realize their vital role in our determination of an organizational mission. We, in fact, enlist their aid in protecting our organizational turf by erecting and maintaining barriers.

When we fall short of system thinking and fail to create a vision of what we want to create, we invariably move to system design without preceding it with analysis. When this happens, we'll be operating on incomplete information. It's like the story of the farmer who was on the witness stand under cross-examination. The attorney asked, "Did you say at the scene of the accident that you were okay?" The farmer replied, "Like I do every Saturday, I got up and hitched my horse to the wagon. I put my dog in the seat and we started toward town. I was rounding a curve when along comes this car on my side of the road." The attorney interrupted, "Just answer the question. Did you say at the scene of the accident that you were okay?"
"Like I do every Saturday, I got up, I hitched my horse to the wagon, I put my dog in the seat, and we started toward town. We were rounding a curve when along comes ...." Once again, the attorney interrupted, "Just answer the question! Did you say at the scene of the accident that you were okay?" "Like I do every Saturday, I got up, I hitched my horse to the wagon, I put my dog in the seat, and we started toward town. We were rounding a curve ...." With that, the attorney lost patience with the long-winded farmer and said, "ANSWER THE QUESTION! DID YOU SAY AT THE SCENE OF THE ACCIDENT THAT YOU WERE OKAY?" The farmer replied, "Like I do every Saturday ...." The attorney railed, "ANSWER THE QUESTION!" The farmer

looked at the judge. The judge concurred, "Please, just answer the question." The farmer replied, "Well, yes. But there's more to the story."

Satisfied with the farmer's answer, the defense attorney was about to dismiss his witness when the judge, noting the farmer's considerable frustration, said, "It's obvious this man has a story to tell. Why don't we give him a chance to tell it." With that, the farmer began again: "Like I do every Saturday, I got up, I hitched my horse to the wagon, I put my dog in the seat, and we started toward town. I was rounding a curve when along comes this car on my side of the road. Next thing I knew I was lying in ditch, my mare was lying in the field braying, and my dog was across the road, lying in the ditch whimpering. Well, it wasn't a few minutes until along comes a state trooper. The trooper got out of the cruiser, walked over to my mare in the field, took one look at her, pulled out his revolver, and, BLAM, shot her dead. He walked across the road, looked at my dog lying whimpering in the ditch, and, BLAM, shot her dead. He walked back across the road, came up to me and said, 'Mister, are you okay?'"

Do we as administrators hold quantum improvement at bay because we insist on operating from incomplete information? Does our interaction ensure that we never will get the real story? Does our interaction instead insist that we will only hear the answers to the questions we've formulated? What about the questions we forgot to ask? We want improved results without putting in the time to understand our system. So how can we change that?

Toward an Organizational Vision

Several years ago, I was involved in the analysis and design of our automated transfer credit equation system. By 1984 standards, it was an excellent system. I examined our existing manual system in great detail. I interviewed admissions evaluators. I interviewed advisers in our academic colleges. I was very focused on this outcome: to replicate the flow of information and decision making in our manual system with a computerized system. I discovered that in the manual system transfer courses, their titles, credits and grades were meticulously transcribed by admissions evaluators from incoming transcripts onto a multipart transfer credit evaluation form. I learned that the academic advisers would equate course-by-course those courses to their GSU equivalents. I learned that each academic college exercised autonomy in assigning those equivalents and wished to retain that control. After one month's analysis, I presented my proposal to a combined group of constituents and received their endorsement. Within three months the system was in place. It served us well — or did it?

Almost nine years after the implementation, it is easy to refer to 20/20 hindsight. Were there things about my approach that would have assured a better system? I believe so. First, I must ask, where was my focus? It was on replacing an existing manual system with a computerized one. I took both the flow of information and the organization structure for granted. I never asked the question, "What basic needs are being fulfilled by the manual system, and how can I use the latest technology to better address those needs?" I never asked, "Given technology's ability to liberate the process from the sequential flow of a multipart document, is there something about the organization structure or the flow itself that might be changed to better serve the desired outcomes?"

What are the desired outcomes of an automated transfer credit system? I've identified a few:

- Identify transfer courses in a form that can be discriminated by a computer-assisted advisement and degree audit system.
- Provide prompt feedback to the applicant as to the applicability of the transfer credit to the degree program of application.
- Facilitate the applicant/student's ability to degree shop across academic colleges.
- Facilitate the student's ability to change to another academic college downstream without having promised equivalents changed or revoked.
- Provide for the capture of supplemental transfer credit (those received after matriculation) in a manner consistent with the original credit.

It is fair to say that I did not spend a great deal of time identifying the desired outcome of the transfer credit system. I was tempted by the very tangible task of analyzing the existing system, rather than confronting the less structured and more intuitive task of questioning the system's purpose. But why was I so inclined?

How Do We See the World Differently?

Trained in a technical profession, educated in a business school, I am steeped in left brain thinking. Left brain thinking is analytical; it breaks things down into component parts. It prefers to approach problems sequentially, using logic. Right brain thinking, by contrast, is creative and intuitive; it thinks in terms of wholes, not parts. It relies more on feelings to make decisions. It prefers to solve problems through patterns and using hunches.

We speak of addressing the "what" or strategic questions first. How does the saying go? "Manage from the left, lead from the right." We should establish direction on the important issues in our lives and work using the intuitive and sensing right side of our brain. Then, once the direction is clear, we should use our logical left brain to organize resources and activities around the objective. Someone put it this way, "How many have climbed the ladder of success, only to realize when they got to the top that it was leaning against the wrong wall?" In other words, the placement of the ladder is far more important than the efficiency with which we climb.

Utilizing our right brain, we must get a broad brush picture in our mind's eye of what it is we want to achieve. With the help of our analytical left brain, the image should be so clear that we can examine its every facet. My family recently moved into a new home we had built last year. For five years, my wife, Cindy, our kids, and I spent every available weekend preparing our six acres to be our homesite. We cleared undergrowth, we planted shrubs and trees, I built a treehouse for the kids, and we cleared more undergrowth.

Often, as we labored on our property, we would dream about the house we would one day build there. Cindy and I often discussed where the house would sit, what its orientation would be, and how the driveway would arc just so as the house came into view, providing the optimum visual setting. In that same period, Cindy spent hundreds of hours poring over house plan books and real estate ads, and together we walked through scores of houses, new and old, in an effort to crystalize our vision of our dream house.

Last year we carefully selected a builder and an architect and then went through the ordeal of watching our dream become a reality. The effort, perhaps more than any other, clarified for me the tremendous payoff that is possible when we seek to bring right brain leadership in harmony with left brain execution around goals.

Perhaps you have been to Underground Atlanta. On a recent visit there, I watched a caricature artist at work. As I stood behind him, I watched his sweeping movements capture the persona of the subject in such a way as a photograph never could. I marvelled at how this artist had captured the subject's soul so that within minutes the portrait had a life of its own. As I watched that artist, I reflected on how essential it was for him to view that subject as a whole, not as component parts—how the artist must sense the spatial relationships in totality, expressing the whole before filling in the details. To view his subject analytically would have produced an outcome devoid of life. Thinking about my own proclivities toward detail, I perhaps for the first time understood my own shortcomings as a visual artist.

Valuing the Differences

What does the caricature artist story have to do with the lessons I learned from building our house, and what does all of this have to do with enrollment services? Building the house clarified for me the tremendous payoff that is possible when we seek to bring right brain leadership in harmony with left brain execution around goals. Within each of us there is a struggle between our rational, analytical ability to comprehend and classify every experience and our sensing, feeling, holistic side that says, "I don't have to explain my world, I have only to sense its meaning." In one area of your life, you may excel analytically, while in another area, you are more sensing and intuitive. You may in a given situation, as I do, feel a struggle within for control over your will. Will you be motivated out of logic or out of feeling? Will your decision arise from analysis or intuition? Will you focus on details or on the whole? The same struggle that goes on *within* us goes on *around* us as well in almost every social interaction. Perhaps in those areas where we wish to exert a creative force, we should aspire as individuals and as organizations for a balance between analytical and holistic thinking.

Why do I describe our house-building experience as gainful in this context? It is because my wife and I have very different thinking styles. It didn't just happen that we were able to collaborate on such a tremendous undertaking. It happened only when we were willing to value our differences when we saw our very different thinking styles as complementary rather than in conflict.

In your organization and mine, we pay a terrible price in lost opportunity when we put others in tidy categories: "He's a techie. She's got her head in the clouds. He doesn't understand computers. She's only looking out for the interest of her college. All they care about is student life. I'll bet he wears his green eye shade to bed." We are, of course, all of us a mixture. Such stereotypes serve only to cut off communication. One might argue that such stereotypes help us understand the motives of others and predict outcomes of human interaction. I submit that those stereotypes simply become a vehicle for gathering evidence to confirm the stereotypes. We declare the earth to be the center of the universe and then we see only that evidence which confirms our hypothesis. We engage in self-fulfilling prophecy.

As a person steeped in left brain-thinking, I can tell you that my struggle in communication with a person whose thinking is incongruent to my own is to listen to feeling rather than words. I remind myself that words are only a small part of the message communicated. Beyond that, my challenge is to listen with an intent to understand rather than rebut.

Returning to the broad brush concept of vision, we must first establish what it is that we want. We ask the strategic or "what" questions. Second, we must come to grips with our present reality. We make no effort to whitewash or dress up our situation. We must own up to the way things are, otherwise we won't be able to accurately identify the steps required to move from our present state to our desired state. We don't have to pass judgement on current reality; we simply have to identify it. Third, we must juxtapose the current reality to our vision to identify the specific steps required to move us from one to the other. Robert Fritz, in his book, *The Path of Least Resistance*, suggests that the juxtapositioning of reality against vision creates a natural tension which will seek resolution. We define the resolution of this tension in the direction of our vision by a set of action steps. We then review that juxtaposition in our mind's eye, over and over, creating the force of will to urge us through those action steps.

Toward System Thinking

Returning to our transfer credit system, I stated that my first mistake was in focusing on what I was replacing rather than what I was creating. I focused on "how" the manual system worked, not on "what" needs it satisfied within the organization. Second, I did not acknowledge transfer credit evaluation as a part of a larger system. Certainly, I recognized that we were dependent on incoming transcripts for source data. But I understood nothing of transfer credit evaluation's role in recruitment. I was not aware that advisers often requested copies of transcripts when the transcribed information told an incomplete story (i.e., transcripts did not identify patterns of course repeats or withdrawals). Likewise, I did not follow the transfer credit issue through to graduation, and, hence, did not gain an understanding of the implications transfer credit, and, hence, the outcome of my automated process held for graduation clearance. And finally, I did not recognize at that time that significant organizational changes, including the shifting of responsibilities, were needed if we were to develop an effective transfer credit evaluation system: one that complemented recruitment and retention. That reorganization, some nine years later, is finally on the table for consideration.

By now you're saying to yourself, this guy doesn't catch on very fast. He's told us about failure after failure. He's painted a mostly dismal picture. Does he never learn from his mistakes? Well, the answer is sometimes—that is to say, I try to. My story wouldn't be complete without a couple of success stories.

Was our view of registration too narrow? In 1985 when we implemented touchtone registration, there were a number of related systems that we failed to adequately acknowledge in the design—among them, student accounts, financial aid, new student orientation, and, what we call reentry (some schools call this readmisision). As a result of neglecting these up front, we addressed them as afterthoughts. We had no choice.

In the fall of 1991, six years into touchtone registration, we began a new registration design

effort. Despite touchtone's success as our primary mode of registration, we were still maintaining a remnant walk-in registration system based on on-line optical scanning for about 5% of our registrants. All of our late registration was handled through walk-in. Prompted by the reality that we were being forced to give up our walk-in registration area, we had to come up with a means of self-registering all students. We decided to implement a self-help distributed terminal system as the alternative to touchtone. Determined to view registration within the context of the larger system we formed an action team representing a variety of related interests. As we designed the system, and the script that would interact with the student, we found ourselves eliminating the concept of an "error message" and replacing it with the question, "What information does the registrant need at this point in the transaction to fully understand his circumstances and his options?" We looked at processes which give input to registration, such as our reentry (readmission) process. We sought ways that we might improve reentry processing so that it might more naturally prepare returning students for the subsequent registration step.

Having just completed the second quarter of TEMPO registration, we are seeing that the transition was far smoother than that for touchtone, and that it has not had an adverse impact on related processes like financial aid, advisement, and fee payment. Just as important, the diverse participation on the TEMPO action team means that many other offices feel an investment and involvement in the system—an unexpected dividend.

Toward Empowerment of People

In the summer of 1992, our registrar, Dr. Sandra Storrar, concerned about the adversity new students face as they come to our campus for the first time, gathered together a group of administrators and advisers whose roles within the University made them sympathetic to her concerns. Our new students have considerable challenges when they arrive. We have parking to accommodate only about 30% of our enrollment. Finding one's way around our campus, where streets and plazas exist on multiple levels, can be very frustrating. Campus signage is poor, and major relief is a year or more away. What Dr. Storrar did at that gathering last summer was ask the question, "What can we do to create a welcoming environment for new and returning students on the most critical first days of each term?" Notice that she didn't say, "How can we fix this, or how can we fix that?" Instead, she asked, "What can we create?" As a group, we did proceed to identify our current reality—those things like signage that needed improvement. But rather than focus on problems, we focused on a desired outcome.

Magically, in just four weeks, and with plenty of other projects also underway, a diverse representation of registrar, advisement, and numerous other administrative staff pulled off GSU's first ASK-ME campaign. We set up ASK-ME stations at strategic remote locations all over campus, staffed for one- and two-hour time blocks by volunteers. Our assistant registrar for registration, Dan, designed a colorful ASK-ME logo to visually identify the concept. We handed out ASK-ME buttons to about 100 volunteers who would wear them during their daily routine. We prepared looseleaf ASK-ME information notebooks packed with timely, helpful information likely to address most any question a student might have. In case the notebook didn't hold the answer, we supplied each remote ASK-ME station with a portable cellular phone so that an answer to a more difficult question could be obtained without referring the student somewhere else.

An amazing thing happened. Not only did the ASK-ME campaign significantly reduce the level of student frustration and reduce the number of students having to stand in a registrar or student accounts line just to ask a question, but it also piqued the interest of dozens of faculty and scores of other administrative staffers. We received numerous calls from those, who hadn't been in on the planning, asking for ASK-ME buttons and wanting to know if they could sign up to work at an ASK-ME station.

Now, I ask you, if we had set out to problem solve, would we ever have created such an innovative response to the first day of class or one that would have involved so many?

Technology: a Powerful Tool, Not a Cure

The interesting thing about the ASK-ME campaign, for all of the benefit it produced, is that aside from the time contributed by volunteers, it cost the university less than $200 and employed no computer technology. We even got the cellular phones as a loan from our local Bell operating company. Some think improvement in today's business world can only come through technology. Despite the value I place on technology, I find that assessment laughable.

In each year of use, we estimate that touchtone registration saves the registrar thousands of dollars over alternative forms of registration. But what was the cost in touchtone's early years when we offered no means to pay fees by phone? This is a cost we will never know, for it was not just the additional cashiering costs incurred by student accounts. It was also the loss of customer loyalty that arose when we led a customer to expect a new level of convenience and service afforded by touchtone registration, only to have that student find that fee payment was harder than before. At least before, the student was already on campus to register, and fee payment only represented a few additional steps.

Improvement comes when we recognize our entire organization is a system and then seek ways within each process to optimize the total system. If technology is focused toward that aim, it will be a powerful tool for the good of the system. If it is focused on sub-optimal solutions, there is no way of knowing what its application has cost us.

The Power of One on One

The expression "too much of a good thing" has lost its meaning in our culture. We seem to think that the more efficient the system, the better. But how do we measure efficiency? Sheerly by numbers. Or sheerly by cost. We rarely think to measure our systems in terms of effectiveness or in terms of the quality or timeliness of human interaction. Strangely, you and I expect to be treated with dignity and as human beings of worth. How is it that we then establish systems that don't comprehend that others need the same?

In closing, I want to share a quote which has profound meaning for me. It comes from the late Dag Hammarskjöld, a former secretary general to the United Nations, who in his autobiography *Markings* said, "It is more noble to give yourself completely to one individual than to labor diligently for the salvation of the masses." I might spend 40 or even 80 hours a week laboring for the worthwhile causes out there and still not have a meaningful relationship with my own

spouse or my closest working associate. And it would take more nobility of character, more compassion, more humility to improve the relationship with the one than to continue to give myself to all those causes. And the amazing thing is that the time we spend healing the one will cure the deeper cancer that affects the many.

U-VIEW Plus for the Macintosh Registration Using a Graphical User

Louise Lonabocker
University Register
Boston College

Students at many colleges and universities are using touchtone voice-response technology and terminal-based systems to display and update data stored on the institution's host computer. Students love telephones, and most institutions have reported enthusiastic acceptance of touchtone, voice-response technology. Computer terminals provide a visual display not available on a telephone set, allowing more involved transaction processing, like changing addresses or viewing the master schedule, and some schools offer this in addition or as an alternative to touchtone, voice-response technology.

At Boston College a more intuitive approach for registration, drop/add, address and telephone number changes, and information display has been developed on Apple Macintosh computers. While many students have used microcomputers for word processing, they often have no experience with terminals that involve the use of tab keys to move a cursor, reset keys to unfreeze the cursor, and enter keys to process a transaction. This paper will describe the evolution of student access systems at Boston College including U-DIAL, which employs touchtone, voice-response technology, and U-VIEW, which can be accessed both from Consumer Transaction Terminals, from terminals with a connection to the mainframe computer, and now from Apple Macintosh microcomputers.

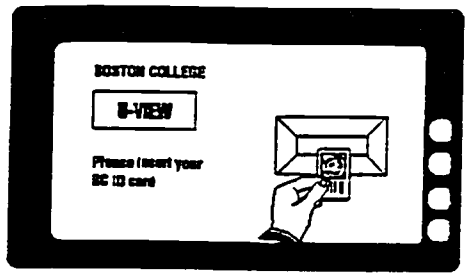
BACKGROUND

Boston College, a Jesuit university, has an enrollment of 14,500 students including 8,500 full-time undergraduates. In 1987 Project Glasnost was launched at the College to provide broad and open access to its computing systems within appropriate security restrictions. The strategy is to capture data at the source and allow end-users to process their own transactions. End-users include managers and their staffs performing their administrative duties from desktop workstations connected to the university's mainframe computer; faculty accessing the administrative system to view the academic records of their advisees and submitting their grades at the end of the semester; and students using a variety of devices to display and update selected information. The first step toward distributed access came in August, 1988 with the introduction of the U-VIEW system.

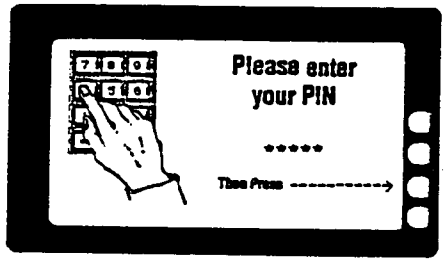
U-VIEW

The U-VIEW system, which first made use of IBM terminals and later added Consumer Transaction Terminals manufactured by Diebold, gives students more localized access to their own academic, biographic, and financial information. (Consumer Transaction Terminals look like Automated Teller Machines (ATMs) without a cash dispensing unit.)

TABLES 1–3 U-VIEW: LOGON AND MENU DISPLAYS



Tables 1–2 illustrate the logon procedure. Table 3 shows the U-View main menu.



U-VIEW
PLEASE MAKE A SELECTION
PRINT GRADE REPORT . . . . . .
ACADEMIC INFORMATION . . . .
FINANCIAL INFORMATION . . . .
QUIT U-VIEW . . . . . .

TABLES 4–8 U-VIEW PRINTOUTS

U-VIEW - LAST SEMESTER 89F

COURSE	COURSE NAME	INSTRUCTOR	SCHEDULE	LOCATION	CR	GR
PL42701	EXISTENIAL PSYCH	SHINE	MW3-4:20	303 CARNEY	03	B+
UN10504	MODERNISM & THE ARTS	HYNES	MWF9	409 LYONS	03	A-
UN10404	MODERNISM & THE ARTS	HYNES	MWF9	409 LYONS	03	A-
EN22401	TENNYSON TO ELIOT	MC CARTHY	MWF1	305 CAMPION	03	B
PL26402	LOGIC	AIKEN	MWF10	306 GASSON	03	B+

U-VIEW - FINANCIAL AID

YR	AWARD NAME	FALL AWARD	FALL SPENT	SPRING AWARD	SPRING SPENT
90	TERM WORK/STUDY	1000	567	1000	0
90	STAFFORD LOAN	1312	0	1313	0
90	GILBERT GRANT	250	250	250	250
90	PERKINS LOAN	750	750	750	0

MORE INFO: FINANCIAL AID, LYONS 210

THANK YOU FOR USING U-VIEW 11/21/90 09:10 AM

UVIEW - ACADEMIC STATUS

SCHOOL: EDUCATION

GRAD YR: 92S
GPA: 3.022

MAJOR: HUMAN DEVELOPMENT
ENGLISH

MORE INFO: REGISTRAR'S OFFICE, LYONS 101

THANK YOU FOR USING U-VIEW 09/30/91 12:37 PM

UVIEW - ADVISOR INFORMATION

ADVISOR: BR LAMBERT
TITLE: LECTURER
DEPT: SCHOOL OF EDUCATION
ADDRESS: CAMPION HALL

PHONE 552-4732

--------YOUR REGISTRATION TIME IS--------
MONDAY NOV 18, 1991 9:15-9:30 AM
PLEASE MAKE APPOINTMENT TO SEE ADVISOR
WELL BEFORE YOUR REGISTRATION TIME

MORE INFO: REGISTRAR'S OFFICE, LYONS 101

THANK YOU FOR USING U-VIEW 10/01/91 02:34 PM

U-VIEW - GUARANTEED STUDENT LOAN

1ST SEMESTER: CHECK RECEIVED
1233.28 DEPOSITED IN YOUR ACCOUNT ON 09/20/91
2ND SEMESTER:

MORE INFO: STUDENT ACCOUNTS, MORE HALL

THANK YOU FOR USING U-VIEW 11/02/91 09:03 AM

Students use the menu-driven system to select transactions that display their class schedule, grades, grade point average, rank in class, final exam schedule, home and local address and telephone numbers, financial aid award, student account and vehicle registration. Using other transactions students see the status of their guaranteed student loan check; their advisor's name, office number and telephone extension; their registration appointment time; their library account; and their financial clearance status. Students also can request degree audits on U-VIEW. To maximize the number of transactions processed, the system always features an "item of the day," which is displayed as the first item on the first menu. For example, at the end of the semester "print grade report" is the item of the day (see Tables 1-3 for U-VIEW: Logon and Menu Displays).

The Consumer Transaction Terminals have some attractive features including character graphics to simplify instruction; function keys for faster transaction selection; an 80-column high speed printer; durability; forced logoff to recapture the ID card; and the ability to retain lost, stolen or invalid ID cards. Students use the system routinely to access information, even when there's no one waiting for service in the office. Two machines are located outside the Registrar's Office, a third near the resident dining hall, a fourth at the library circulation desk, and a fifth at the Saw School, located a mile from the main campus. The machines are reliable, requiring only normal maintenance like checking the paper supply and retrieving captured ID cards.

U-VIEW provides a fast, visual display of a limited set of functions and the devices conveniently serve a resident population. "One of the nicest things about the system is the ability to print the information at the touch of a button," said one sophomore economics major (see Tables 4-8 for U-VIEW Printouts). It is not a replacement, however, for other methods of distributing transaction processing to end users, including touchtone, voice-response technology or microcomputers with connectivity to the host computer. Using host-connected microcomputers and terminals, students can simulate an entire schedule or scroll through a selected range of courses. Voice response technology is ideal when students want to transact business from work or home, check the status of a course, or drop/add.

U-DIAL

In August, 1990 a touchtone, voice-response application for drop/add called U-DIAL was made available to a test group of 700 students. The voice response unit (VRU) selected was distributed by IBM. The students gave U-DIAL a positive evaluation, and in November of that year all undergraduates were able to register for courses using touchtone telephones. The touchtone, voice-response system resembles systems developed at other institutions. Students processing registration by telephone enter their student ID number, their Personal Identification Number (PIN) and their registration access code. The registration access code is printed on the student's registration form, which is distributed to the student's advisor, and when the advisor releases the form, the student is clear to register.

U-DIAL maintains the edits of the previous online registration system for closed, restricted and

permission of department courses; time conflicts; registration holds; and attempts to logon before the registration appointment time.

After logging on to U-DIAL, students hear a menu of five options: add a course, drop a course, add and drop a course, list courses, and course status. The course status option was added after students reported they wanted to check the availability of courses before registering.

The real advantage of U-DIAL for students is the availability of the system and the chance to modify their schedules anytime between their registration appointment through the last day of drop/add.

U-VIEW PLUS

In November 1990 when U-DIAL was introduced to undergraduates, a similar registration application was developed for work-study students who in the course of their work at the university used terminals with a connection to the mainframe computer. Approximately 300 students participated in the test of U-VIEW Plus. Workstudy students who had access to the administrative system previously had access to the U-VIEW system to display their biographical, academic or financial information from terminals in their offices. Registration was added as an additional function to their user menu. (Each user of the administrative computing system has a position-based user profile, which identifies the systems, transactions, and update capabilities available to that user.)

The terminal-based system has several advantages over the touchtone, voice-response system. Terminals have both keyboards and display screens, which usually are not part of a telephone set. Using terminals, students can enter all their course selections at once, search for open sections of courses, and display information about courses including titles, instructors and meeting times (see Table 9 for the U-VIEW PLUS Screen Display). "This is the most convenient way to register," said one senior. "No long lines and no busy phone!"

By January 1991 there were 27 telephone lines and 25 terminals available for drop/add. The terminals are located in the central computing facility, and staff from the registrar's office are available to answer questions about the systems.

Directions for using U-VIEW Plus were printed in the registration publication, but students usually sat down in front of the terminal with no instructions, expecting the computer to lead them through the transaction. Now logon instructions are posted at each terminal, the menu displayed after logon shows available options, and each screen contains instructions for completing that transaction. All update and display screens are designed for minimal cursor movement by the student. The student just enters course index numbers and hits the enter key.

By September 1991 students were attuned to processing their own registration and drop/add transactions, in-person registration was eliminated, and there were 25 percent fewer overrides. "There was less student traffic in the department," reported one department chair. "Students had used the system over the summer to try to get courses that closed during registration, and many of them were able to get what they wanted."

"It's so much better than drop/add," said one staff member. "Before we entered course requests and told the students if the course was open of closed. Now we assist the students in the use of the system, and the computer communicates the message that the course is closed!"

Users of U-DIAL and U-View Plus rated them positively, but the majority of students were not convinced that U-VIEW Plus had advantages over U-DIAL. Only 20-30 percent of the students were using U-VIEW Plus; the rest were using U-DIAL. "The telephone is more convenient," said a sophomore management major, which explained why the telephone switch was overloaded during registration and drop/add.

To encourage more students to use the U-VIEW Plus system, a new transaction was added in the spring of 1992 to display the master schedule of courses (see Table 10 for U-VIEW PLUS Open/Closed Courses Screen Display). Students could display all courses in a department, all sections of a course, or all courses in a specified range of courses to determine the current availability of courses. The display is tailored to the students' status; for example, English majors do not see the "restricted to majors" message for English courses that non-majors see.

By the fall of 1992 students could also logon to the system from their home or dorm room, which made the system more convenient for students with microcomputers and modems. Also in the fall of 1992 students were able to update their local, home and parent addresses and telephone numbers on U-VIEW Plus. Students had been able to display this information, but now they could update the information directly, saving a walk to the registrar's office and the completion of a change of address card.

The enhancements were attractive, but U-DIAL still held the lead. It wasn't until a graphical user interface for registration was designed on the Macintosh that U-VIEW Plus edged out U-DIAL.

U-VIEW PLUS FOR THE MACINTOSH

During registration in the spring of 1992 for fall courses, a group of 200 resident students was invited to participate in a test of an alternative to the existing telephone and terminal-based registration systems. The enhanced U-VIEW Plus system for the Macintosh allowed students by using a mouse and familiar Macintosh icons to point-and-click their way through registration.

The terminal-based registration system is command-driven, requiring students to type in commands such as "save," "done" and "quit" to perform these operations. The new interface is more intuitive; it denotes commands with pictures or icons and limits the amount of keystroking (see Tables 11 and 12 for Opening Screens for U-VIEW PLUS for the Macintosh).

After selecting U-VIEW from the Macintosh "desktop" and logging onto the system, students arrive at a registration screen where they enter course index numbers (see Table 13 for the U-VIEW PLUS for the Macintosh). By clicking on the checkmark icon, they retrieve information about all courses entered including the title, instructor, meeting time and closed or restricted status of the course.

TABLE 9 U-VIEW PLUS SCREEN DISPLAY

SELF REGISTRATION FOR 91S
NAME: DAVID W SMITH
SCHOOL: A&S
MAJOR: ECONOMICS

TODAY: NOV 14, 1990 TIME: 9:40
APPOINTMENT: TUESDAY
NOVEMBER 13, 1990
9:30 - 9:45 AM

* TO ADD A COURSE, ENTER THE INDEX NUMBER.
* OR ENTER ONE OF THE FOLLOWING IN THE "INDEX" COLUMN:
"N" GETS THE NEXT AVAILABLE SECTION "D" DROPS A COURSE
"F" GETS THE FIRST AVAILABLE SECTION "Q" QUITS SCREEN - NO CHANGES MADE

	INDEX	COURSE	CR	TITLE	SCHEDULE	INSTRUCTOR	COREQ
	8358	HS060 01	03	RISE OF EUR:EAST/WEST II	M W F 1	SPAULDING	
>	6705	MA302 01	03	FINAN ACCT STDS/THEORY II	M W F 1	<SCHOOL RESTRICTION	
>	4101	GM281 01	03	GOETHE'S FAUST II	T TH 10:30*	<COURSE CLOSED	
>	1479	GE125 01	03	PLANET EARTH II	M W 2	<COREQ REQUIRED	
>	5205	EN022 31	03	CRIT READING & WRITING II	M W F 1	<TIME CONFLICT	

*COREQUISITE GE126 REQUIRED

TABLE 10 U-VIEW PLUS: OPEN/CLOSED COURSES SCREEN DISPLAY

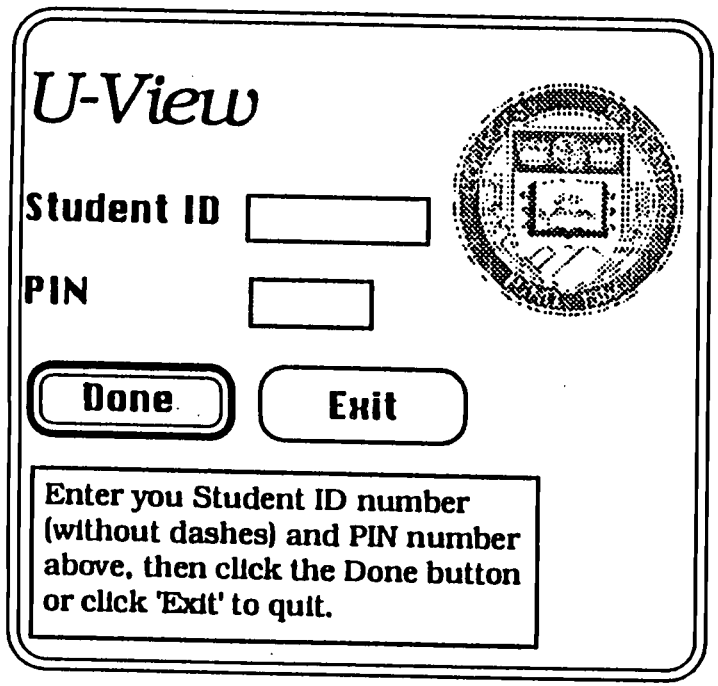
92S COURSES FOR ALL GRAD/UNDERGRADS

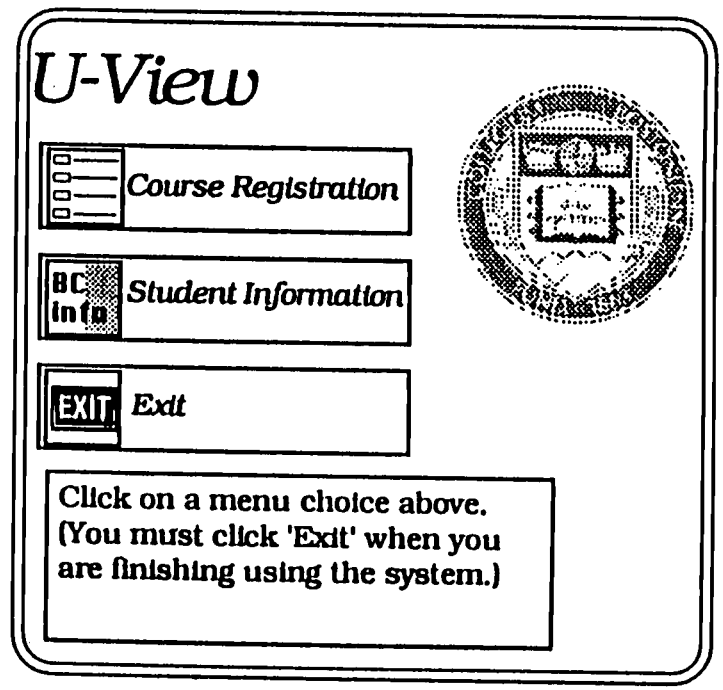
ENTER COURSE OR DEPT: EN5
EXAMPLES: BI__ LISTS COURSES STARTING WITH BI
EN1__ LISTS COURSES STARTING WITH EN1
MT101 LISTS COURSES STARTING WITH MT101
"QUIT" RETURNS YOU TO THE UVIEW MENU

INDEX	COURSE	CR	COURSE TITLE	SCHEDULE	INSTRUCTOR	COMMENT
8904	EN507 01	03	20TH CENT IRISH FICTION	T TH 10 30*	MORRISON	
3261	EN512 01	03	OLD IRISH	M W F 1	CONNOLLY	
7917	EN528 01	03	HISTORICAL LINGUISTICS	M W F 10	CONNOLLY	
3264	EN536 01	03	MOD IRISH SHORT STORY	T TH 12*	DALSIMER	
5886	EN543 01	03	HUMOR	T TH 3*	LEWIS	*CLOSED
8907	EN563 01	03	GOTHIC &ROMANTIC NOVEL	M W F 9	RICHARDSON	
2694	EN572 01	04	TECHNIQUES/PRECISE EXP I	W 6 30-9 00	CHRISTIAN	*CLOSED
6819	EN575 01	04	PROFESSIONL COMMUNICATION	M 6 30-9 00	PIOSTROWSK	*EVENING
4794	EN579 01	03	WRITING WKSHP:FICTION	M W F 12	CASPER	*CLOSED
5055	EN579 02	03	WRITING WKSHP:FICTION	T 3-5	BERNAYS	*CLOSED
4797	EN584 01	04	WRITNG WRKSHP:TECHNICAL	TH 6 30-9	COYLE	*EVENING
4602	EN591 01	06	SCHOLAR OF THE COLLEGE	BY ARRANGEM	DEPT	
9735	EN593 01	03	ADV COLLOQ/WOMEN STUDIES	M 3-5	WILT	*CLOSED
5889	EN596 01	03	ROMANTIC MOVEMENT/ENGLAND	T TH 9*	MAHONEY	*CLOSED
1398	EN599 01	03	READINGS AND RESEARCH	BY ARRANGEM	SCHRADER	

PRESS "RETURN" TO DISPLAY NEXT PAGE

TABLES 11–12 OPENING SCREENS FOR U-VIEW PLUS FOR THE MACINTOSH





More illustrations on following pages.

TABLE 13 UVIEW PLUS FOR THE MACINTOSH

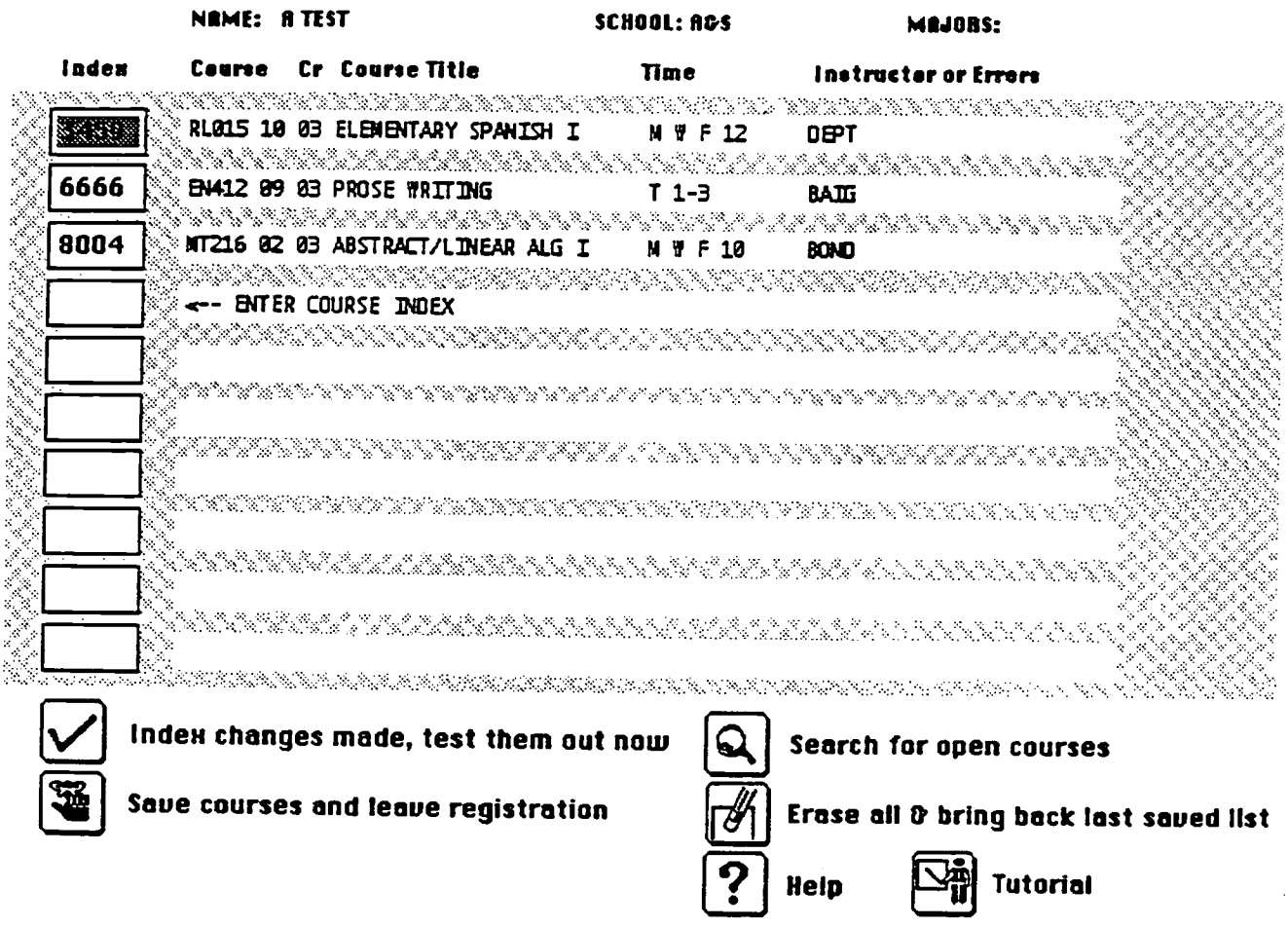
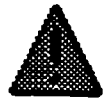


TABLE 14 UVIEW PLUS FOR THE MACINTOSH SAVE REMINDER



Are you sure you want to save all error-free courses and erase all courses you have entered which have an error listed?

<- Yes, save error-free courses and erase other courses in list?

<- No, go back to the courses listed (warning: no courses will be saved).

To save courses, students click on the save (hand) icon, which stores their available courses and removes closed, restricted and conflicting courses (see Table 14 for the U-VIEW PLUS for the Macintosh Save Reminder). Students may then continue to work on their registration or may exit the system. The erase option, depicted by an eraser icon, is used mostly during drop/add when students rearrange schedules, get into a muddle, and just want to return to their original schedule.

Despite having various levels of computer knowledge, students involved in the experiment were able to register with no training or written instruction. Students new to the system begin by clicking on the tutorial (teacher) icon (see Table 15 for the Tutorial) or the help (question mark) icon (see Table 16 for the Help Screens). As they move through the process, additional information is provided. If a course entry generates an error message, a new (puzzled) icon appears; clicking on it brings up a help screen of error message definitions (see Tables 17 and 18 for the Error Messages and Help Screens). Some errors generate an additional exclamation point icon and message, which helps the student resolve the error easily (see Table 17).

The highlight of the system is the course search and select option. By clicking on the icon of a magnifying glass, and entering a department prefix and number, groups of related courses are shown with current displays of course availability (see Tables 19-21 for the Macintosh Course Search and Select Options). Selecting a course is as easy as using the mouse to set the pointer on it, clicking, clicking next on the checkmark icon, and the student's schedule reappears on the screen with the new course. This is more convenient than the terminal-based system, which requires leaving the registration transaction to select the course browse transaction.

"I love this mouse thing," remarked one student. "It's friendlier." The experiment was judged a success; more than 80 percent of the students surveyed preferred it over alternative methods (i.e., telephone and terminal). "Over the phone there's too much pressure and no visual feel of the schedule," said one participant.

One common user problem that was eliminated with U-VIEW Plus for the Macintosh was the locking or freezing of the keyboard, which resulted from invalid keystrokes on the terminal-based system. Staff were freed from repeatedly showing students the location of the reset key, and instead were able to spend more time answering questions related to registration.

During the summer U-VIEW Plus for the Macintosh was introduced to approximately 800 freshmen and transfer students who came to campus for summer orientation and registration. After observing their interaction with the application, additional improvements were made. Over time, the system will contain the artificial intelligence necessary to anticipate student actions and tailor prompts to help them through the course selection process. For example, if a student begins to enter a course number, e.g., EN02101, instead of a four-digit index number, a dialog box pops up on the screen reminding the student that the index number is a four-digit numeric.

In the fall of 1992 U-VIEW Plus for the Macintosh was available to all students and was enhanced to include all U-VIEW information displays and updates (see Tables 22-25 for the Information Selection and Display and Update Screens). All 75 Macintosh microcomputers in the student computing facility were equipped with the new software. It was a good thing that so many devices were available because the telephone traffic on U-DIAL stabilized, while the

number of students using U-VIEW Plus quintupled. Many of these users were freshmen who had been trained to use the system, but the upperclass students were attracted to it because they like "the Mac". "It's refreshing to see that the new system is modeled after the user-friendly environment of the Mac, which most students can understand," said one sophomore.

During registration for second semester courses in November, 70 percent of the freshmen used the Macintosh for registration compared to 40 percent of the remaining students.

The new interface was created with a front-end development product called "Both" by Connective. This tool allows the design of Macintosh-type objects and associated scripts which send both transaction names and the input required by existing mainframe applications. Communication between the Macintoshes and the IBM host is driven by the "Both" application through Avatar's Netway 2000 gateway.

The product expedites the conversion of mainframe transactions to Macintosh-like screens by providing the developer with facilities for capturing the "look" of each of the administrative transactions, creating Macintosh objects (windows, lists, buttons, fields), and making associations between these objects and mainframe fields. Once all potentially encountered mainframe screens are captured, the designer can determine the most friendly layout, the array of options necessary for the untrained user, and write command scripts which are invoked when, for instance, a particular button is pressed. It is important to note that the Macintosh-like interface overlays, rather than replaces, existing administrative transactions working behind the screens.

CONCLUSION

Future plans call for extended hours of U-VIEW Plus, now available from 9:00 a.m. to 7:00 p.m., access from dormitories and development of the system within the IBM Windows framework. The registration system will be integrated with other campus-wide services, such as access to the O'Neill Library catalogs, making all services available from a common platform. By leveling system-specific idiosyncrasies, every person on campus can have a simple way to access services from a personal workstation.

Students currently have dialin (slow) access to the U-VIEW Plus system from their home or dormitory room if they have a microcomputer and a modem. Eventually a campuswide network will provide students with easy access to the system. At that time, assuming that most students will have devices in their rooms, greater access to information will be made available including degree audit, online catalog and course descriptions.

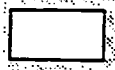
Business is conducted in new ways now thanks to the degree audit, U-VIEW, U-DIAL, voice mail, electronic mail, and automated call distribution, resulting in new and revised job descriptions. It is difficult to attribute staff changes to any one development but within recent years two recorder positions were merged, one member of the service staff was not replaced, and a desktop publishing position was created. Changes and reductions were made through staff attrition.

Boston College will continue to develop this integrated approach to record keeping. Client/server

models will move more of the activity to local processors, with intermediate servers going to the host to capture or update data. The goal is to allow student access from anywhere and at anytime, using the most convenient and accepted method.

TABLES 15–16 UVIEW PLUS FOR THE MACINTOSH TUTORIAL AND HELP SCREENS

STEP 1 - Entering Course Index Codes



A column of boxes, each like the one shown to the left, is where you will be entering your index codes. You can enter one 4-digit code in each box.
To type numbers into a box, you will first have to go to the box by clicking anywhere in the box (or by pressing the "Tab" key until the box is highlighted).
You can remove a number from a box by tabbing to the box and pressing the 'Delete' key or replace the index with another by typing in the new index.

STEP 2 - Checking Schedule for Errors

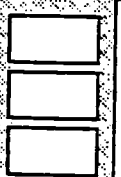
After entering index numbers, you will click on a checkmark icon at the bottom of the screen (it will look like the icon to the left). After clicking, the index codes you have entered will be checked for any scheduling errors and course information will be displayed to the right of the index codes.
You can add, delete or change index numbers as many times as you wish. After each set of changes, click on the checkmark icon to have the schedule checked.

STEP 3 - Saving Your Schedule

Your schedule will be saved when you click on the hand icon (like the example shown to the left).
*** Warning! Until you do this, no changes are saved ***
If there are errors listed, this save option will let you save the courses which are okay and erase the ones listed with errors.
If no errors are listed, this save option will allow you to save your courses and leave the registration system.

<- Click on this star to begin registering.

INSTRUCTIONS
The text below explains the purpose of each box or icon which you will be using.
When done reading, click on the star ------>



A column of boxes, like the one shown on the left, is where you enter course index codes. You can enter one 4-digit code in each box.
To type numbers into a box, first click anywhere in the box (or you can press the "Tab" key until the cursor moves to the box).
Get rid of a course by deleting its index from the box (then click the checkmark).

Click on this icon after you have made entered or changed index numbers in the boxes on the left side of the registration screen.

Click on this icon if you want to search for course information.

Click on this icon whenever you want to save the courses you currently have listed on the screen.
*** No changes you make on the screen are saved until you do this. ***

This icon will appear if there is one or more course errors listed. Click on this icon to display more detailed error messages.

This icon will appear when there are registration notes for you to read in its accompanying box.

Click on this icon whenever you want to return to this instruction screen.

TABLES 17-18 UVIEW PLUS FOR THE MACINTOSH ERROR MESSAGES AND HELP SCREEN

NAME: A TEST SCHOOL: AGS MAJORS:

Index	Course	Cr	Course Title	Time	Instructor or Errors
1170	BI130	01	03 ANATOMY & PHYSIOLOGY I	T TH 9*	<COREQ REQUIRED
8265	NU812	04	01 RESEARCH PRACTICUM III	BY ARRANGEMEN	<NEEDS DEPT PERMISSIO
6666	EN412	09	03 PROSE WRITING	T 1-3	BAIG

Index changes made, test them out now

Save error-free courses, erase others

*COREQUISITE BI310 REQUIRED
*COREQ INDEX: 2472

Search for open courses

Erase all & bring back last saved list

Help

Error descriptions

Click on the star to return to the registration screen

This option appears when you have one or more errors listed to the right of your course entries. Below are fuller descriptions for those short error messages.

<INDEX NUMBER INVALID

You have entered an incorrect course index number.

<DUPLICATE COURSE

You have entered the same course index number in more than one box.

<RESTRICTED TO MAJORS

This course is restricted to majors.

<SCHOOL RESTRICTION

This course is restricted to students within the school which offers the course.

<COURSE CLOSED

Course is no longer open for enrollment. The available slots have been filled.

<COURSE CANCELLED

Course will not be offered in the upcoming semester. You must select an alternate.

<COURSE OVERLOAD/CREDIT OVERLOAD

You went over the maximum number of courses you may register for. Permission for more courses must be obtained first.

<NEEDS DEPT PERMISSION

This course requires the permission of the department in which the course is taught.

<TIME CONFLICT

You have two or more courses with overlapping times.

<COREQ REQUIRED

This course has a corequisite course which must be taken. This means you must put the index number associated with the coreq. in another box.

TABLES 19–21 UVIEW PLUS FOR THE MACINTOSH COURSE SEARCH AND SELECT OPTIONS

You can search for courses by entering the first three or more characters of a course number in the box, then clicking the checkmark.

Search examples:
"AL055" "MT6" "EN101"
(Use zero, not the letter O within numbers.)

<- Enter search criteria in this box


<- Click here to search


<- Click here to cancel search

... please hold on, I'm looking for "MT2" courses ...

9380	MT20101	3	ONE	INTERMED CALCULUS II	M W F 10	KREBS
9591	MT20102	3	ONE	INTERMED CALCULUS II	M W F 1	KREBS
5502	MT20201	4	TWO	MULTIVARIABLE CALCULUS I	MWF1/TH130	GROSS
5505	MT20301	3	TWO	MULTIVARIABLE CALCULUS II	M W F 10	KEOUGH
5595	MT20302	3	TWO	MULTIVARIABLE CALCULUS II	M W F 1	SHANAHAN
[illegible]						
8346	MT21703	3	TWO	ABSTRACT/LINEAR ALG II	M W F 12	KEANE
8469	MT21704	3	TWO	ABSTRACT/LINEAR ALG II	M W F 2	ROSEN
7959	MT24401	3	ONE	DISCRETE STRUCT/APPL	M W F 12	KENNEY
6828	MT29101	3	ONE	GEOMETRY FOR TEACHERS	M W 3*	KENNEY

END OF SELECTED COURSES

Note: You can select a course by clicking on a course listed above.

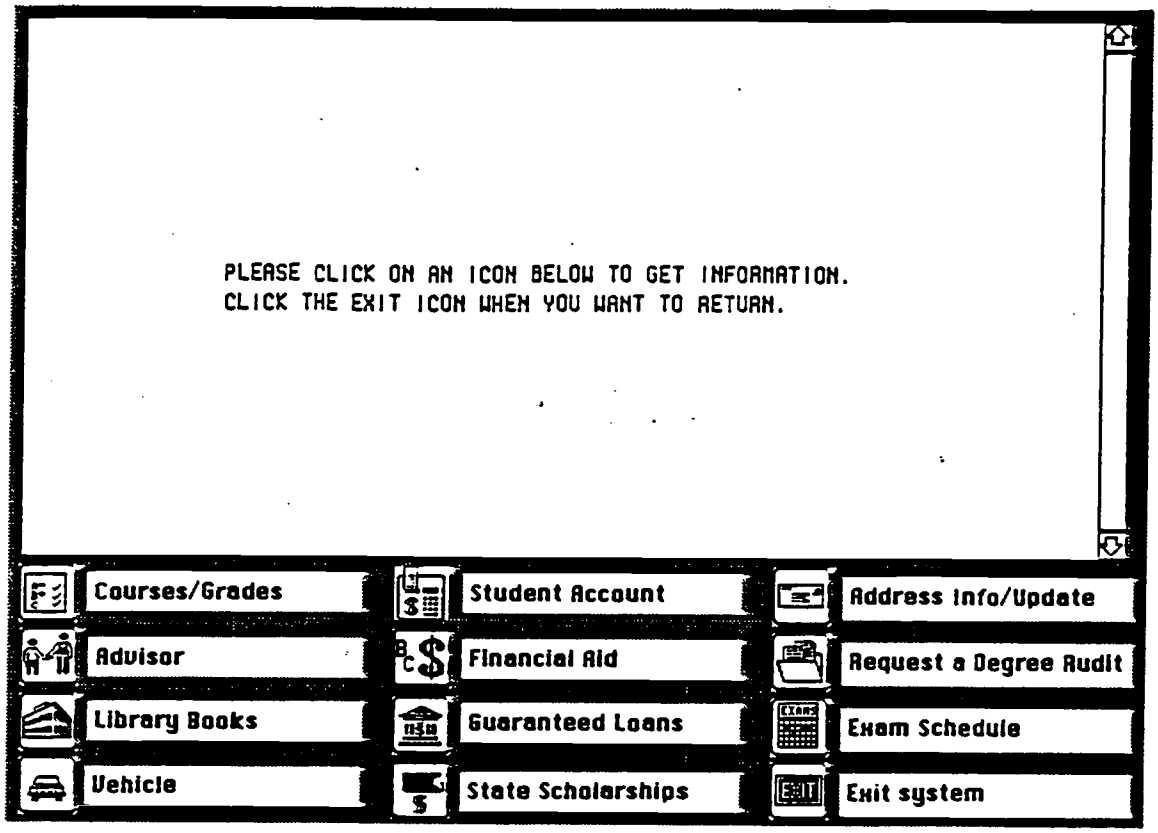

Search for course -> MT2

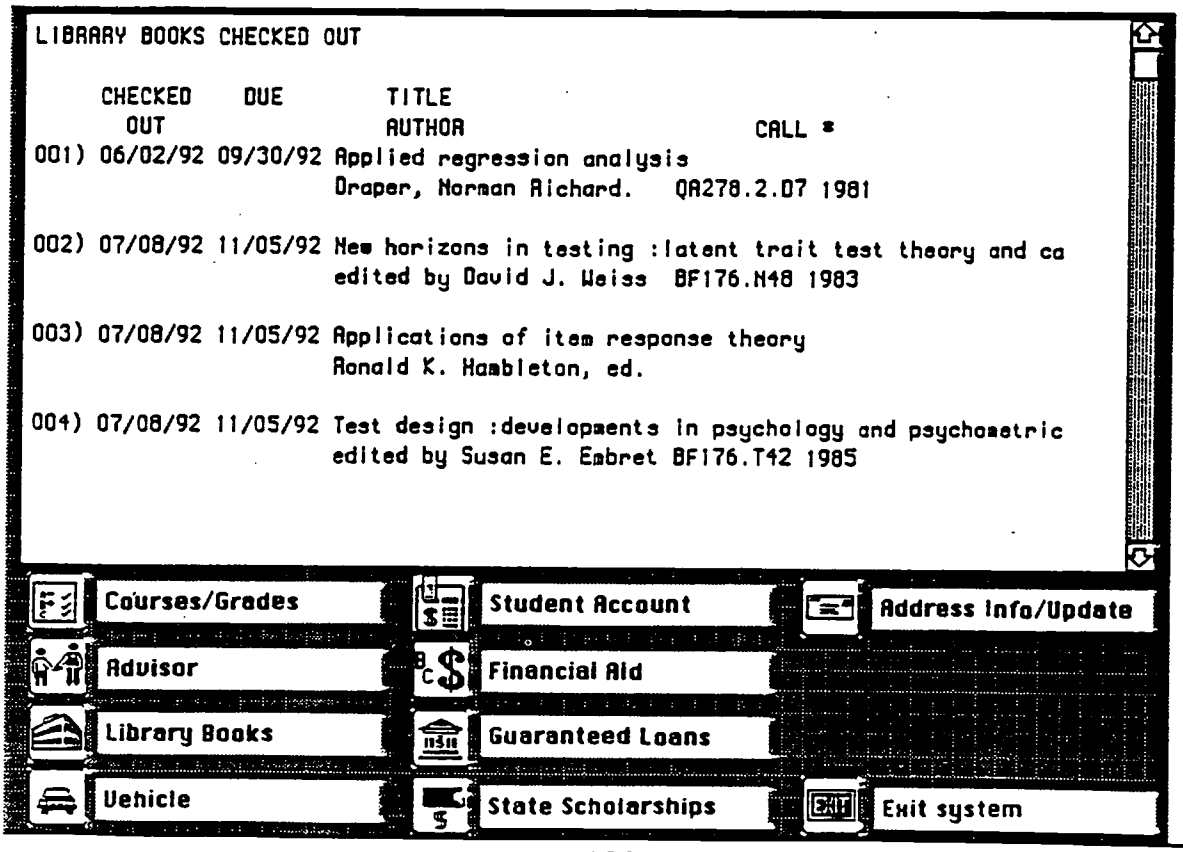

Help


Return with course selected


Return without course

TABLES 22–23 UVIEW PLUS FOR THE MACINTOSH INFORMATION SELECTION SCREENS





TABLES 24–25 UVIEW PLUS FOR THE MACINTOSH DISPLAY AND UPDATE SCREENS

```
STUDENT ADDRESS INFORMATION

  1.    LOCAL ADDRESS
           683 WASHINGTON ST                    PHONE: 277-8024
           BROOKLINE          MA 02146

  2.    HOME ADDRESS
           683 WASHINGTON STREET                PHONE: 617-662-6899
           BROOKLINE          MA 02146

  3.    PARENT ADDRESS
```

Update Local Address

Update Home or Parent Address

Cancel - Return to Menu

Student Name

Doe, John F.

Home Address Information

Street	1 Sutherland Rd.						
Apt./PO/etc.		(Only for U.S. address)					
City	BROOKLINE	State	MA	Zip	02146	-	
Country		(If NOT U.S.)					
Phone	617-734-2222	(e.g., 617-555-1234)					

Parent Address Information

Name(s)							
Street							
City		State		Zip		-	

Done

Help

Quit - Return to Menu

Errors:

Total Quality Enrollment Management

Jim Black
Dean of Enrollment Management
Winthrop University

Introduction

A growing number of institutions are using the tools of Total Quality Management (TQM) to implement their enrollment strategies. On the surface, TQM does not appear to provide ideas which are new to enrollment managers. We have always known that the student is our customer, that sound research should be the basis for decision making, and that our staffs are more productive when they function as a team. Why, then, is TQM worthy of further consideration? Simply stated, TQM is a fanatical commitment to common sense. In a very focused and intentional way, it provides a method for continuous improvement.

Basic human nature suggests that everyone wants to be good at what they do. Unfortunately, people are often not empowered to achieve their best. W. Edwards Deming claims that 85% of the problems in any organization are not caused by people but rather by the system. Of the remaining 15%, most are caused by management. According to Lloyd Dobbins, "In a battle between good people and a bad system, the system will always win." How can we, as managers, improve our systems, empower our staffs, and respond to the voice of the customer when we have overwhelming day-to-day responsibilities?

TQM and Higher Education

The successful implementation of TQM is extremely difficult. In fact, only three of every ten TQM efforts in the public and private sectors produce results that are meaningful to the organization. To be successful, TQM must become the way we go about our work, and it must be driven by a survival imperative. William E. Hull, provost at Samford University, once said, "TQM is animated by a survival imperative. Nothing short of that urgency will motivate human nature to meet its rigorous demands." For those of us who are responsible for recruiting and retaining students, the survival imperative is clear:

- As resources for higher education decrease, the quality of the educational experience is likely to diminish, causing students to become more dissatisfied with their experience, resulting in increased attrition and poor public relations, which will adversely impact enrollments. Since enrollments, to a large extent, determine resources, the cycle continues. The only leverage which we can apply to reverse this system is to improve quality as resources decline, so that students will be more satisfied and enrollments will increase (Figure 1).

- As the supply of students entering higher education decreases, competition increases. It is a buyer's market.
- As costs rise and the demand for more public accountability continues to escalate, customer expectations increase.
- As the environment changes rapidly around us (e.g., demographic shifts, Higher Education Reauthorization, society's needs, new technology), the needs of our customers also change.

In the words of Peter Drucker, "The best way to predict the future is to create it." Enrollment managers must have a vision for their organization which complements the vision of the institution. Without question, in the year 2000, institutions of higher learning will be very different than they are today. Registration will occur exclusively by phone or via personal computer in the residence hall room, transcripts will be transmitted across the country electronically overnight, and enrollment verifications will likely be centralized through a national clearinghouse. National service and direct lending may become a reality, and there will be another Reauthorization of the Higher Education Act in 1997. Admissions officers will continue to witness an increased competition for students, and glossy publications and video may be replaced by interactive video as the preferred recruiting tool. The point is—change is the only constant. Capacity to create a vision for change and then pursue that vision is essential to long-term enrollment success.

TQM must be driven by that vision. Otherwise, quality improvement efforts will not produce results which are meaningful to the organization. By linking quality improvement to the Vision Statement of your enrollment team, you will create a sense of urgency among your staff, establish the importance of quality improvement to the top leadership, and focus your resources more strategically. The following Enrollment Team Vision Statement at Winthrop University conveys a clear direction for valuing the contributions of each employee, facilitating student growth and development, and providing quality services.

Winthrop's Enrollment Team Vision Statement

Every member of the Enrollment Team is valued, appreciated for his/her contribution to the University, and empowered to make a difference in the lives of students. Because we are committed to facilitating each student's growth and well-being, we are driven to understand their changing needs and to provide services which are of the highest quality anywhere. We intend to be the absolute **BEST**—and in doing so we enhance the recruitment, retention, and success of our students.

Strategic Planning

The Vision Statement serves as a conceptual anchor from which all strategic planning evolves. Phase One of the strategic planning process begins with thorough assessment. As Oliver Wendell Holmes said, "The first step toward improvement is to face the facts." Assessment may include an organizational assessment of your culture, an environmental scan, customer satisfaction surveys, a competition analysis, a value-added analysis, a cost/benefit analysis, or possibly the Malcolm Baldridge criteria adapted for higher education. Without

the appropriate assessment on the front end, you may be wasting valuable time and resources implementing a plan which will not produce the desired results.

Use the information revealed through your assessment efforts to establish long-range goals and short-range objectives which are focused on the pursuit of your vision. Next, identify the processes which are critical to the attainment of each goal or objective. For example, the Admissions Office may have a goal of providing information to prospective students before its competitors. One related critical process is the flow of admissions applications. By reducing the time between the receipt of an application with supporting credentials and the student's notification of acceptance, the Admissions Office can improve the timeliness of its response to prospective students.

When the critical processes have been identified, process teams should be selected and trained in the basic concepts and tools of TQM. There are basically two types of teams: natural work groups and cross-functional teams. A natural work group consists of individuals within a functional area who usually work together on a given process (e.g., the receptionist, who opens incoming mail and forwards applications to the data entry specialist, who then keys in relevant data and gives the completed admissions file to a counselor, who makes the admissions decision and passes the file to the director of admissions, who reviews the decision and returns the file to the data entry specialist, who generates the appropriate decision letter and mails it to the waiting student). Cross-functional teams are created to focus on processes which are not confined to a single functional area. For instance, a team formed to improve the scholarship process might include the chair of the scholarship committee, the director of financial aid, the support staff person who processes scholarship awards, an admissions counselor, an athletic coach, and a development or alumni representative.

Regardless of the type of team needed to study and improve a process, team members should all be process owners. The team leader will be the primary owner of the process, and there should be a facilitator who is external to the process. Team memberships should always be voluntary, and everyone in the organization should be given an opportunity to participate. Whenever possible, teams should be composed mostly of EAGLES (the top 20%, your very best people), some BLUEJAYS (the middle 60%, average to above average employees who are productive but are not necessarily leaders), and occasionally a BUZZARD (the bottom 20%, the eternal pessimists).

Staff Empowerment, Training, and Development

Established teams must be empowered to improve their process. Empowerment is a gift of time, money, human resources, and the authority to make decisions. Parameters and limitations must be recognized and communicated to the team before the process of continuous improvement begins. When teams produce valid solutions within the

predetermined parameters, the chief enrollment management officer and/or department head must support those decisions. Furthermore, successful teams should be recognized and rewarded.

Before teams begin the quality improvement process, they need training in TQM concepts and tools. The training should be "just-in-time," which means that the knowledge and skills acquired through training should be applied immediately to the actual improvement of a process. As with any learning, the application of knowledge translates into relevance and true understanding. With only a two- to three-day training session, an individual can be a productive member of a quality improvement team. However, if this were all TQM were about, it would be of little substance. David Kearns, CEO of the Xerox Corporation, captured the true essence of TQM best when he said, "In the race for quality, there is no finish line." Customer needs are always changing; our systems are complex and interrelated; and quality is an elusive goal. Consequently, the learning process is never- ending.

As we seek to change our culture through TQM, the creation of a learning organization is essential. Every member of the organization should be given opportunities for professional development. Rewards, evaluations, and promotion should all be linked with skills and knowledge learned. For example, the team within your enrollment area which simplifies a process for students could be rewarded with personal computers, new software, travel funds for professional development, or time off. In the evaluation process, admissions counselors, who serve as the window to our colleges or universities for prospective students, should be required to demonstrate the information they have gained about the institution and the profession. Too often, good people leave our ranks because they were never challenged or recognized for their accomplishments. The inability to maximize human potential is truly our greatest failure as managers. We must foster an environment where people feel valued and are rewarded for the behavior we most desire. Three of Deming's Fourteen Points for Quality Improvement support the notion that we must "drive out fear" in our organization, "remove barriers to pride of workmanship," and "encourage education and self-improvement for everyone."

Ensuring TQM's Success

Any organization can begin a TQM initiative, but only those which have an adequate infrastructure can sustain it. Such an infrastructure consists of ongoing learning opportunities, rewards, and recognition directed towards teams for quality improvement, a venue for sharing quality success stories, an evaluation process which measures those contributions which are important to achieving the vision of an organization, a method of providing immediate feedback to employees, and a culture which is open to change. Upon the completion of a comprehensive strategic planning process initial training and the development of the appropriate infrastructure, your enrollment team can begin the quality journey.

As indicated in Figure 2, there are eight basic steps to improving a process. The first is understanding those we serve, our customers. An assessment of customer needs begins with the recognition of who is being served in a given process. In every process, there are customers who are external to the process (e.g., in the registration process, there are students

who receive a class schedule, faculty who receive a class roll, and senior administrators who receive enrollment figures) and customers who are internal to the process (e.g., in the registration process, there are staff members who admit students to the registration area, make IDs, enter course requests in the computer, accept payment of fees, validate IDs, produce class rolls, and generate enrollment statistics). Each internal customer is a part of a supplier/customer relationship where inputs are supplied by one internal customer to the next. During the process, improvement occurs when value is added to the product or service, resulting in outputs which meet or exceed the expectations of the external customer (Figure 3).

In the May/June 1993 issue of *Change* (p. 11), the vice president of the American Association of Higher Education, Ted Marchese, wrote, "Quality is what the customer says it is." To be quality-driven is to view everything we do through the eyes of the customer. The customer is king, and our job is to provide the customer with what he or she needs on time, every time. Surveys, focus groups, and formal complaint mechanisms are instruments through which we can monitor the pulse of our customers. If we lose touch with the needs and expectations of our students, they will quickly become dissatisfied and leave our institutions.

The second and most important step in the quality improvement process is analyzing the problem. Traditionally, higher education's approach to a problem is to appoint a committee or task force to identify solutions. In his book, *The Fifth Discipline*, Peter Senge asserts that the cure can often be worse than the disease. Frequently, we implement solutions which in the short term appear to be successful but often have devastating long-term effects. This phenomenon is due to our failure to understand and resolve the root cause of a problem. Most problems can be compared to the layers of an onion. The initial symptoms are usually at the surface; a visual blueprint of the related process through flow charting depicts deeper problems. Cause and Effect Diagrams (also called Fishbone or Ishikawa Diagrams) are used to analyze cause and effect relationships and identify root causes.

By establishing the source of a problem, the team can generate strategic solutions (step 3 in the quality improvement process) which focus on prevention and target resources toward improvements that will have a long-term impact. After solutions have been identified, the team should determine which measures (step 4) are important to evaluating the success of changes which are implemented (step 5). The key measures should be goal-directed, relevant to the process change, measurable within a reasonable time frame, and comparable to existing baseline data. When determining key measures, less is always better. Once the measures have been established, team members (the process owners) can pilot changes on a small scale, collect data, and measure the results (step 6). If process changes are successful, the improvements can be standardized, and the accomplishments of the team should be shared throughout the organization (step 7). Following this step, the team begins to study the second highest priority problem in the process (if one exists) or returns to the voice of the customer to ensure that all needs are being met (step 8).

Periodically, the chief enrollment officer should evaluate the cumulative results of individual teams to determine progress towards the organization's vision. A thorough review may result in a new direction (vision) for the organization or continued improvement within the context

of the existing vision. Either way, the quality journey does not end. The late Vince Lombardi, coach of the former World Champion Green Bay Packers, once said, "Perfection is not obtainable, but unless you chase it, you will never catch excellence."

In the real world of enrollment management, the very nature of our work as well as the environment in which we compete compels us to improve every day. TQM offers a proven means of:

- implementing a strategic plan that produces desired results,
- maximizing the use of resources,
- increasing productivity,
- enhancing communications,
- reducing rework,
- improving employee relations, and
- increasing market share.

Ultimately, TQM will produce greater customer satisfaction, which will allow you to realize your enrollment goals.

Figure 1.
Three Tenets of TQM

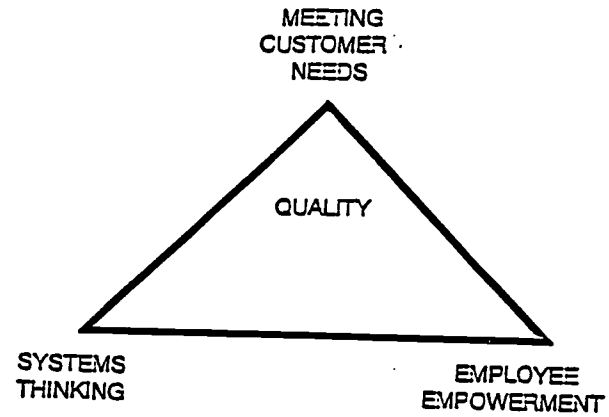


Figure 2

SYSTEMS THINKING

- Understand Customer Needs
- Study Current Process
  - flow chart process
  - brainstorm problems
  - prioritize problems
  - analyze root causes
- Identify Solutions
- Develop Key Measures
  - existing baseline data
  - relevant to process change
  - goal directed
  - frequent data points
  - measurable within a reasonable time frame
  - doable
- Insure Accuracy and Precision of Data
- Determine if Process is Stable
  - variation is the enemy of quality
  - common cause variation
  - special cause variation
  - histograms
  - scattergrams
  - run charts
  - control charts
- Determine if Process is Capable
- Continue to Improve Process

Figure 3

BENEFITS OF TQM

- ABILITY TO DEFINE AND ADHERE TO A CLEAR MISSION
- IMPROVED CAPABILITY TO PLAN AND EXECUTE PLANS
- COST CONTAINMENT
- PRODUCTIVITY ENHANCEMENTS
- COMMON INTERNAL LANGUAGE AND TOOLS FO PROCESS IMPROVEMENT
- ABILITY TO COMMUNICATE RESULTS
- PEOPLE HAVE A VOICE
- CHANGE IN MINDSET
- REDUCED REWORK
- BETTER EMPLOYEE RELATIONS
- INCREASED MARKET SHARE
- GREATER CUSTOMER SATISFACTION

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Resource Organizations

AASA Total Quality Network
1801 N. Moore Street
Arlington, VA 22209
(703) 875-0748

American Productivity and Quality Center
123 N. Post Oak Lane
Houston, TX 77024
(713) 681-4020

American Society for Quality Control (ASQC), Inc.
611 E. Wisconsin Avenue
P.O. Box 3005
Milwaukee, WI 53201
(414) 272-8575
(800) 952-6587

Yes, New Technology Affects Recruitment and Marketing!

Gene T. Sherron
Professor of Information Studies
Florida State University

Introduction

> The dawn of the information age is behind us. But don't get too excited because it's still morning and a long time to lunch.
>
> *Paul Stern, Chairman and CEO, Northern Telecom, Ltd.*

As a part of the strategic planning process, it is important to back away from day-to-day activities and dream about what possible changes can be made to enhance administrative computing using new and future technologies. Developing such "visions of the future" should be done without the constraints of a current year budget. Yet, proposals should be realistic enough to excite implementation because they reveal cost-effective alternatives compared to the current systems.

New Technologies

By 2001 almost everyone will have an omniphone—a compact computer-type device that is voice-activated with the capabilities of a FAX, TV, VCR, and fingerprint reader (Jones 1990). What is a new technology? Some say that "new" is so far out that only conceptual descriptions apply. Others say that you must be able to touch and feel it. For the purpose of this review, "new technologies" are considered to be those that are implementable now, which means that some or all of the hardware, software, or ideas are already developed to a point where "reality" stretches from today to just a few years from now.

As a side note, we know that when a technology reaches a 70% penetration level within our society, it is regarded as "generally available." Such is the case with the automobile, telephone, television, and now the VCR, but we are not yet at that level for the personal computer, facsimile machine, or networking. Yet, it is predicted that "electronic keyboards" will be at that level in 1993. Given the exponential rate of assimilation of technology in America today, it is reasonable to assume that we can count on a considerable market penetration by a number of technologies in the decade of the '90s.

The technologies considered in this paper, both current and potential, are listed below:

- Client/Server Hardware
- Data Interpretation Systems
- E-Mail (Local and National)

- Executive Information Systems
- Expert Systems
- Facsimile Machines
- Graphical User Interfaces
- Handwriting Interfaces
- Imaging and Optical Disks
- Interactive Video/Teleconferencing
- Multifunction ID Cards
- Integrated, Multimedia Workstations
- Networking—LANs and WANs
- Voice-Response Systems

A New Way of Thinking—From the Top

Techies love to promote technology. And the '90s show promise that top management will really understand technology to a point where there is hope that organizations will begin to examine the way they do business and look for supportive automation applications from the top down. Our past is replete with examples of throwing technology at a problem, only to have it bounce off like silly putty. Until and unless the very top management truly embraces a totally new way of looking at the functions of a university, these new technologies will be less than what they could be.

The costs and/or commitments for new systems are

- The president must provide top-level support to the development of an *information architecture* for campus-wide information systems to support both managing and operating.
- Vice presidents must promote *functional systems reviews* of their current operational activities, much like a systems analysis. *Design* can take as much time as *development.* ("Systems people don't usually create software defects. They usually creep in much earlier through inadequate or unclear *user specified* requirements and specifications." ("Bugs Begin at Conception" 1991)
- *Universal Information Systems*, which provide information access to the entire university community of students, staff, and faculty, should replace the older, limited-access or "need to know" systems.
- Technology should be *integrated* into functional operations, if it contributes to effectiveness and efficiency. There will be a balance of function and technology.
- New systems come with a *cost.* Management must be prepared to "spend money to make money."
- *Training*, even retooling, is critical to success. Both the techie and the user need training. Top management must set the example by finding time to personally learn how to use the new systems.

Foundational Strategies for Administrative Systems

Throughout the development of the concepts presented here for enhancing and streamlining administrative processes, some foundational strategic philosophies should be endorsed as fundamental to the process.

- *Source Point Data Capture.* Data is entered via workstations in the department of origin and transferred electronically to the destination office. Any requirements for approval at a higher level re-route the document through the appropriate office for an "electronic signature."

- *Value-Added Data Handling.* The data's electronic route depends upon a user's need to add information or approve a document. For those administrators not in the hierarchical flow from source to target office, on-line queries and management reports are available.

- *Destination-Point Document Generation.* Documents are printed in the destination office as needed for external communication and verification.

- *Transaction Tracking System.* Events are tracked in audit trail records with individuals restricted to activities and data corresponding to their area of responsibility (Chachra and Heterizk 1989).

Problem Areas

In developing the four visionary perspectives, consideration was given to the major problems typically associated with the computer-supported processes. For example, problems can be seen in the following areas:

- Accessing information
- Customer satisfaction
- Excessive overtime
- Formatting/presentation form
- Inconsistent image to the public
- Lack of required information
- Lack of space
- Redundant effort
- Timeliness of action
- Application backlog
- Error
- External communication
- Inadequate staff
- Intra-area communication
- Labor-intensive process
- Missed deadline
- Response time
- Training

The Admissions Process

In the functional area of admissions, the approach used is to look at the issues by (1) briefly *describing* the administrative (functional) process, (2) *identifying* the problems most commonly encountered in the process, and (3) *suggesting* the application of technologies to improve or enhance the process.

The admissions function begins with a policy decision relative to the quantity and quality of students desired by the institution. Then, a macroeconomics model comes into play as the "demand" for entry relates to costs, student preference, likelihood of acceptance, prestige, etc., while the "supply" refers to space, institutional goals, resources, etc. In practice, state laws often stipulate that community colleges will have an open admissions policy. Thus the community colleges are accepting in-state applicants with high school diplomas, and adults may enter without diplomas on a provisional basis, as space permits. At the other end of the spectrum, major state universities and private institutions invoke restrictive admissions policies which constrain enrollment. The reasons for controlling admissions range from policy decisions to cap enrollment, space and resource constraints, and a desire to enhance demand by restricting the supply.

Functions of the Admissions Process

In the simplest sense, the functions of admissions are

- *Standards* for admissions
- The *recruitment* process
- The *application* process
- *Evaluation* of applications
- *Notification* of applicants
- *Management* of the process
- *Transfer* to registration

The Admissions System

There is no "typical" admissions system. Universities are as individualistic as people. Thus, there is no "accepted standard" for the conduct of the admissions process. To describe the admission process, a generalized system of admissions is used. All the while, it should be realized that this is the Florida State University (FSU) process, and in some cases it is not the same as those of the other eight universities that make up Florida's State University System (SUS).

Standards for Admissions

The admission of students to a university (such as FSU) is subject to the minimum standards adopted by the governing body (the Board of Regents for the State University System of Florida). Usually, admission is on a selective basis within curriculum, space, and fiscal limitations. Statements such as these appear in college catalogs and bulletins to help explain to the public why they (or their child) did not get admitted.

On a more practical and annual basis, universities must set standards for admission. Based on its history, available classroom seats, and what it is trying to achieve in funding levels, a university decides on the size of next year's student body. In Florida, each SUS university annually submits enrollment plans by level (lower-division undergraduates, upper-division undergraduates, master's degree students, and doctoral degree students) and by program (from accounting to Yugoslav-American studies, or a total of 275 programs). Based on predictions of a large number of returning students, a determination is then made as to the number of students that should be

added to these enrollment categories to achieve these program enrollment goals (levels). The funding of the FSU, as is true with most state institutions, is "enrollment driven." Meeting enrollment goals, give or take a small margin of error, is referred to as hitting the "enrollment corridor," which means full funding. Falling outside of the established enrollment corridors may result in penalties to the institutional funding process. This reality offers a great deal of motivation to attain the goals. And, it places great pressure on the director of admissions to hit the established enrollment goals.

The university has a standing Committee on Admissions made up primarily of faculty members. This Committee works with the director of admissions to develop attainable goals, relative to the supply and demand associated with the various academic programs. They use experience factors, derived from considerable institutional historical data, to establish the number (quantity) of students, by various enrollment categories, that will be granted admission in a certain time frame, for a specific semester/term, in order to achieve the desired enrollment results.

Having thus determined the gross number of applications that will be accepted, the emphasis then shifts to getting the best (quality) students to fill out that number. Yet, because universities are dealing with thousands of applications to yield hundreds of quality students, a set of "standards for admission" is developed and used to drive most of the admissions process. For example, a student with a B average from specified high school units (classes) and test scores of at least 26 on the ACT or 1150 on the SAT would meet general admission requirements. Associated with these "performance" (high school grade point average) and "potential" (general academic aptitude tests) standards, admissions officials evaluate the "quality" of the graduating high school, ratio of in-state to out-of-state students, demographic balances, and the like. Finally, a cutoff date is set, after which no applications are accepted.

In summary, the ground rules must be developed annually. These are then published and widely distributed in a university catalog or bulletin, and those who meet the admissions standards expect to be admitted.

The Application Process

High school students interested in attending college know that one of the hurdles is test taking, either SATs or ACTs. On the application form for these tests, students select which universities are to receive their results. These results are sent electronically to these universities, along with certain demographic information which was keyed in from the test application.

By law, Florida high school transcripts flow up to the SUS universities in electronic form. A program called the Florida Automated System for Transferring Educational Records (FASTER) is the system that provides Florida school districts, public community colleges, and the SUS universities with the means to exchange transcripts and other student records electronically. This is a form of electronic mail in which the "messages" are the requests for transcripts and the "answers" are the electronically transmitted transcripts. The programs and the database "mail boxes" they serve run at a regional data center, and the Florida Information Resource Network (FIRN) provides the communications network for the interchange.

Another aspect of Florida law is the requirement that an application fee be paid before an application can be "processed."

The third component needed for a complete application package is the SUS three-page application form with an affidavit certifying residency. With these three components present in the system, a prospect's electronic file is created from the paper file that includes the application, fee receipt, transcript, and test scores. In certain cases, letters of recommendation are a part of this process.

In the case of graduate students, the normal procedure is for the Admissions Office to build a paper file and then route a duplicate of the file to the appropriate academic department for evaluation. Considerable energy is expended in the process of keeping up with these files and making sure that the departments have received all relevant information.

The Evaluation of Applicants

The selection process for students includes such factors as grades, test scores, educational objectives, class rank, pattern of courses completed, past conduct, personal records, and school and personal recommendations. With over 12,000 freshman applicants for 3,000 slots at Florida State, the vast majority of the potential freshmen get into the "selected" category based on an evaluation of the high school GPA and national test criteria. Yet, the universities must compute the GPA based on "specified" (a matter of Florida law) high school courses. The statewide, common course numbering system used in the public high schools facilitates the identification of the acceptable courses and the computation of the acceptable high school GPA.

Additionally, many universities practice what is called an early acceptance policy as a means of getting a commitment out of prospective students. In such programs, high school seniors apply early in the fall, and, assuming they meet the admissions requirements, get an early admission decision, contingent upon subsequent receipt of satisfactory transcripts and verification of high school graduation. There is also an early admittance program for 11th graders, which, however, involves only a handful of students. Most high school students apply to several universities and it is for this reason that the admissions officials must accept more than twice as many applicants as will actually matriculate. At Florida State, the "show rate" is about 40% for freshmen.

This leads to the obvious conclusion that most of the admissions energies go to the process at either end of the quality spectrum. Universities start as early as the 9th grade in demonstrating interest in the brightest and most able students such as the National Merit and Achievement Finalists. To capture these quality students, most universities have Early Admission programs and are willing to accept students upon completion of the 11th grade. On the other hand, each university employs an Alternative Admission program to admit a limited number of students who do not fully meet the selective academic criteria but who would bring diversity to the university community—such as writers, artists, athletes, individuals with significant life and career experience, and members of under-represented minority groups.

Notification of Applicants

Throughout the year, admissions officers evaluate completed applicant folders relative to the enrollment goals of the various class levels and programs mentioned earlier. These evaluations lead to a favorable admission decision or the need for more information or, if appropriately confirmed by the director of admissions, a rejection. In all cases, the official selects the appropriate paragraphs from a range of previously developed paragraphs that make up the "notification letter generator" system. As a batch program, run each evening, letters are prepared on a high-speed laser printer, complete with signature, stuffed in envelopes, and sent to the applicants. (All letters that carry a negative reply are personally reviewed by the admissions director for accuracy.) Yet, all such letters, whether requesting additional materials or notifying the applicant of acceptance, cost about three dollars each to produce and mail. The Admissions Office spends approximately $100,000 annually on postage. There is no evidence that this system produces inappropriate letters. Nonetheless, the earlier mentioned foundational strategic philosophy of entering data nearest the source of capture reduces this as much as possible.

Managing the Process

Early each January, the pressure begins to build as admissions evaluates the "acceptances" in the various freshmen categories and programs relative to the previously established goals. In terms of management, the individual colleges and schools are responsible for recruiting and "academically" admitting their graduate students. Statewide articulation agreements require that the SUS institutions admit any transfer student who has completed an associate in arts degree at a Florida public community college. Thus, the only variable in admitting such students to the university is assuring that these applicants have provided the appropriate documentation. A number of high-demand programs are referred to as "limited access programs" and require a higher than average GPA for program acceptance. Other transfer students, assuming proper academic credentials, are admitted assuming they fit into the enrollment categories and programs of the university.

This leaves, as the largest group to be managed, the incoming freshmen class. This is a large and important group—one-sixth of the institution's total enrollment and the life blood of the institution for the next four years. The director of admissions needs weekly and, at certain critical times in the admissions cycle, daily information about applications, admissions, and acceptances to influence this process. From time to time, the director will present these data to the Committee on Admissions as it is called upon for policy guidance for the process. The most effective valve that can be turned is the set of current admission standards. Earlier it was noted that these standards are set on an annual basis to bring in a certain number of students. Such standards (i.e., high school GPA and test scores) can be moved up or down to affect that number. Additionally, the colleges and schools can be encouraged to call or correspond with selected students to encourage the enrollment of admitted students.

Admissions officials can travel to the high schools to meet with students, parents, and guidance counselors to promote applications. However, this is usually done very early in the recruitment cycle and does not usually relate to last minute enrollment decisions.

Transfer to Registration

Starting in February, the Orientation Office begins contacting the accepted students to schedule a two-day visit to the campus in the June-July time frame. At the close of orientation, students register themselves for fall classes using the telephone registration system for the first time. At this point, the responsibility for maintaining the records begins to be shared with the registrar. But students are not part of the enrollment numbers until they have officially enrolled, which includes tuition and fees payment and attending classes. (One of the best indicators that the accepted applicant will become a student is if they attend orientation—98% actually enroll.) Once enrolled, students now become a part of the permanent records file and are the responsibility of the registrar. The passing of these paper and electronic new student files to the registrar begins the next phase of the Student Information System—registration.

It is interesting to note that the first thing the Office of the Registrar does with the admissions file is convert the paper file to microfiche to save space and reduce the potential for lost records. Questions that require data from original application documents usually arise during the first semester. So, after twelve months of retention, the original documents are shredded.

As can be seen, the admissions process is quite complex. In most cases, the description of this process was generalized or focused on the freshmen. To do proper justice to the procedure, it should be pointed out that there is a unique and specific process for each category of students—freshmen, transfer, international, and graduate.

Problems Commonly Encountered in the Admissions Process

Most admissions systems function adequately. Were this not so, the institution would not operate well and/or would soon go out of business, because admitting students is at the heart of the system. Thus, the problems are at the margin and most often have to do with refinements that lead to improved effectiveness (i.e., yield rate) or efficiency (meaning the productivity of the staff as affected by work flow and computer systems).

With these thoughts in mind, a generalized description of the typical problems encountered in the admissions process follows. These are in no particular priority order.

Early Identification of Students

Colleges and universities seek to enroll the best possible students. In this case, "best" usually refers to the student most likely to succeed in the particular educational setting of the institution. The best indicators for success are high school performance and standardized test scores, in that order. Obviously, the high school results are somewhat variable based on the quality of the high school. Therefore, admissions officers try to find these better students as early in the process as possible. It has become common practice for Admissions Offices to start a dialogue with 9th graders who show real academic promise. High school guidance counselors, alumni, parents, and friends become the source for the identification of such prime prospects. By the 11th grade,

college-bound students start showing up on admissions officers' recruitment lists as national test results become available. For example, it is not unusual for a high school student who does well on the PSAT/NMSQT to receive over 100 pieces of unsolicited mail from colleges and universities in April and May of his or her junior year. Florida State, for example, sends out materials to 20,000 PSAT test takers each year. But the vast majority of the mailings received by the student will be from private institutions (Canterbury 1990). The lower cost of state universities, compared to the private universities, requires the private institutions to work harder to achieve desired enrollment levels.

Handling the volume of mailing activities, not to mention cost, is a significant labor expenditure for Admissions Offices. For the highly desirable students, 18 to 24 items/mailings go out over a three-year recruitment campaign. The typical student hears from the university every 6 to 8 weeks from mid-point in the junior year of high school until he/she applies. Once an application is received, the applicant receives a mailing once a month.

As mentioned earlier, an application cannot be processed officially unless a nonrefundable $15 application fee is paid. The official nature of the admissions file is further hampered by the state rule that applications cannot be accepted until twelve months before the starting semester.

The admissions officer's worst nightmare becomes a reality on the rare occasion when the discovery is made that a National Merit Finalist, the child of a prominent alumnus, and a talented minority student all enroll at a competing institution on the very same day, because they somehow slipped through the cracks.

A Question of Resources to Achieve Goals

In any organization, there are never enough resources to assure that all goals are met. Thus, the planning and allocation of resources often build on past years' experiences, and adjustments are made accordingly. This is the case in efforts to achieve admissions goals.

The organization of admissions materials, storage and retrieval of admissions documents, notification of and correspondence with applicants, visitations, and the like can consume significant resources with uneven results. How much is enough and how much is wasteful?

Managing the Admissions Operation

On a day-to-day or week-to-week basis, the admissions officer must keep track of the process and apply midstream corrections to the activities in an attempt to improve goal attainment. This need requires that data be maintained and compared to goals and state and national trends, and actions on adjustments applied. Some of these activities can be automated while others are accommodated through intuitive judgments.

Pushing the Paper

Much human effort goes into the processing of such items as applications and letters of recommendation. The Admissions Office is a sea of paper. Hundreds of pieces of mail arrive

daily and are opened, routed, entered into the computer, and stored or shredded. On a periodic basis, admissions officials review the files—paper and electronic. Fewer than half of them are found to be complete on the first review. This prompts the preparation of a letter to the applicant requesting the missing item(s). Again, this is a time-consuming process for everyone involved—the student, the high school counselor, and the admissions officer. Additionally, academic departments must review all graduate files. This is a costly activity in terms of the staff time spent in processing the files through the faculty and tracking these files in a timely manner. For instance, four admissions officials are devoted to this process throughout the year. It takes ten minutes for an admissions official to calculate the GPA based on specified courses and evaluate the application, or over one and a half man-years of effort.

Applying Emerging Technologies to Admissions

A Distributed and Friendly System

There is a growing interest on the part of managers in controlling their own systems. Requesting jobs to be run, modifying reports, or changing parameters on outputs continues to be a cumbersome process for users as they try to understand the typically unfriendly nature of programs associated with host-based application software. Yet, the concept that "no man is an island" certainly applies to student information systems. In addition to the flow of data from admissions to financial aid to housing to orientation to registration to accounts payable to health records to advising to alumni, there is an almost start-to-finish interrelationship that requires an integrated information system.

Universities need off-the-shelf software to transparently link mainframes into client/server networks. Such user-friendly software would feature pull-down menus, windows for multiple sessions, icon/mouse-driven software, and predefined screens for data input and manipulation. This type of software would be designed to optimize the client/server environment such that powerful workstations and servers would be located in the Admissions Office but linked to the mainframe where database management systems (DBMS) and system management functions take place (Moad 1991). In this manner, computing is moved down to the departmental and distributed levels, yet powerfully integrated to the university's relational database/system query language (SQL) standard of administrative computing.

Such an application of distributed database capability will be a true asset to the enterprise in years to come as management information systems (MIS) make the transition to universal information systems. With adequate security and integrity features built into these systems, all of their users—students, staff, and faculty—will have access to the systems and will even be able to make corrections to the data if they are the best source for that data.

Distributed DBMS allow two or more databases to open simultaneously, whether they are on the same node or different nodes. Such a feature would be used frequently in administrative applications when connectivity to other databases is required. It promotes the elimination of the duplication of data. A further benefit of distributed database technology is found in its ability to distribute data across nodes which are linked together via communication networks like TCP/IP.

In the '90s, these nodes will be in the administrative and academic departments. Data will reside nearest to the action. Another attribute of such distributed systems is that they will operate in a heterogeneous equipment environment. Powerful workstations, providing cheaper millions of instructions per second (MIPS) from a variety of vendors will operate interchangeably to allow easy access through open architecture via windows-type systems. With data stored on any number of nodes, users can get to any and all of the data without having to know the storage locations. At the same time, for efficient maintenance, it would be possible to store data on the computer (server or mainframe) where it is most often used.

Recalling that the admissions director must work closely with the Committee on Admissions to develop annual parameters for admissions criteria, a relational DBMS with SQL-based access to the data could be provided by Executive Information Systems (EIS). PC-based EIS packages are becoming available that can run on a client/server PC LAN that is linked to the host as a mainframe-based cooperative-processing product accessed through a SQL server (Stamps 1991). Additionally, these systems can provide graphical presentations to help in modeling the admissions criteria.

Moving to relational DBMS and SQL environment carries significant software development costs and increased computer costs in terms of cycles and DASD. So for users who have no need or desire to go beyond the use of simple inquiry screens, any difference between an application written using a relational DBMS and an application written as a flat COBOL file may go unnoticed. But, the relational model is easy for novices to use and understand. More sophisticated users find RDBMS and its associated tools to be very powerful and to reduce their dependency on central computing staff.

Such liberation of the users leads to the development of reports and the use of data interpretation systems which were never thought possible without programmer support. This level of user involvement provides the foundation for users to take advantage of natural language interfaces to databases, which allows end users to have full access to their data by simply making their requests in English (Golden and Eisenberger 1990).

There are many benefits that drive such an investment in software. First, friendly software means that the staff of the Admissions Office can be easily trained to work the system. Simple, easy-to-use systems provide for cross training among the staff, and such a capability allows the director to move staff around to perform different functions as the workload demands. Finally, a windows-type menu environment suggests that tutorials and help keys can be built into the software. This reduces training time spent away from the office and allows the staff to start using the system with minimal start-up time.

Instantly, An Electronic File

The powerful but distributed system just described would have intelligence built into it, and, through an expert system approach, would cause the creation of an individual applicant's pre-application record as the result of the first electronic document or transaction that comes in from any source. This source could be the electronic application from the high school student entering it from the counselor's terminal, a dump of the SAT or ACT tape that indicates an interest in the

university, or a phone call from an alumnus recommending the recruitment of a certain student. And, as another option, students could use FAX machines to send their application to the Admissions Office's 800 FAX number. In turn, the FAX would make a digital entry into the applicant's file through an OCR conversion process, rather than generate another piece of paper to be filed.

The technology exists to make the admissions application process a paperless process. The task is designing software for that purpose and writing the software interfaces to allied SIS applications that enable it all to work together in harmony.

The large public high schools in Florida are on line with the school district offices that are linked to the Department of Education through FIRN. This linkage via FIRN also includes connections to all public community colleges and SUS universities. Thus, the electronics are in place to allow students to make on-line application(s) to their university(ies) of choice from a high school counselor's office. (The University of Florida is piloting such a project with Seminole County School District this year. And, AACRAO is considering a nationwide system along these lines.)

It is estimated that moving the data entry to its source, the applicant, would save two staff-years of keystroking, and its automation into an electronic form would save three more staff-years of time annually.

Day-by-day, these electronic files grow as information flows in about individual students. Nightly, these files could be uploaded to the host so that other administrative and academic departmental offices could have access to the latest information about accepted/admitted students. Yet, to be sure the university presents itself as a single image and conveys the impression that it is coordinated in its approach to future students, it is important that all contacts with prospects be in collaboration with the Admissions Office.

Additionally, the expert system software would monitor the student's file as it develops. When such a data interpretation system determines that certain item(s) are required to complete an applicant file, the system would automatically generate a letter to the applicant requesting the item. The ideal paperless approach would be for the system to send an electronic mail, or e-mail, message to the high school asking the student for the missing item. In truth, a simple step such as making a mailing label on demand would please most admission people.

National E-Mail

The concept of sending electronic mail (e-mail) to prospective students is not limited to Florida. Assuming the use of national networks and addresses provided by out-of-state students, such e-mail reminders and correspondence should continue to grow in acceptance and economy.

As a reference point relative to the growth of national networking among universities, NSFNet is currently connected to over 1,500 networks (Roberts 1990). Also, the federal budget now contains funding for the new National Research and Education Network (NREN) which would further expand the Internet nationally and globally.

Smart Mailings

We know that the first mailing to a busy high school student must be bold and distinctive to get his or her attention. A "smart" (expert) system is needed to keep track of a university's mailings so that prospects receive neither too many nor too few mailings. Such a system is viewed as "smart" by the administration because it could reduce the costs associated with mailings. This means another expert system needs to be running to make a daily review of files to determine the types of information that need to be sent to the prospect to encourage application and/or acceptance.

Many universities, such as the University of Florida, have developed a timing algorithm related to "weeks before the start of classes" which ensures that mailings go out every three to five weeks either in response to a question or as a reminder of the university's interest in them. Again, remember that the Admissions Office becomes the campus-wide coordinator of mailings to prospective students to avoid duplication in mailings or the peaks and valleys of interest, at least from the standpoint of the prospect. Using the distributed database system mentioned above, academic departments can view the files of their admitted students and even develop mailings. In all cases, however, the mailings are to be released by the Admissions Office.

A "Floppy" Application

Another alternative is for universities to send out their application materials on a floppy disk. Then, the prospects can browse through information found on the floppy to learn about the applications process, catalog information about majors and courses, and financial aid opportunities. To apply, the prospect sends the completed application on the floppy back to the university in its franked, self-addressed mailing envelope. Drexel University is sending out 50,000 floppies (MS-DOS) to their prospects so they can learn about Drexel and complete the application process on their home computer (*The Chronicle of Higher Education* 1991).

A Speedy Acceptance

Seventeen-year-olds lead busy lives at intense emotional levels. Some make their college selection decision based on the first acceptance received. Others wait until all the "offers" are in. Recognizing those are the two extremes, it is nonetheless critically important for universities to get acceptances out as rapidly as possible.

The "smart" admissions system will be designed to cut the six-weeks' procedure for preparing student application files in half. A quicker acceptance notice to the best and brightest students in the application pool increases the chances that these students will attend Florida State rather than a competitor.

Imaging

It is reasonable to apply imaging technology to some of the software described above. For instance, applicants could send in a paper form which, upon receipt in an Admissions Office, would be scanned into the system. This same scanning would apply to other paper materials

relative to the process (i.e., high school transcripts, letters of recommendation, acceptance letters, etc.). The University of Southern California installed such an imaging system, which enables its Admissions Office to convert the hundreds of thousands of documents into digital information. Admissions counselors can view interactively all these documents on a workstation, speeding up the time it takes to process applications and financial aid requests (*CIO* 1991). If one were using an imaging system, a natural fallout of the work flow would be the use of a handwriting interface. Using a lightpen to "write" on the image, admissions officials could note scores, student activities, or other aspects of the student's high school record for further review by others in the process of evaluation.

The "Expert" Evaluator

In the friendly software described earlier, it will be important to build into the design as many expert systems as possible. In addition to the overall "intelligence" of looking for a complete applicant file, there must be an expert system component that computes the high school GPA based on the approved courses for admission to SUS institutions. Since the State of Florida's Department of Education uses a common course numbering system which records the courses taken in the applicant's high school transcript, the data exist to facilitate this automated evaluation process. (Today an admissions officer spends ten minutes to make such a calculation on each transcript.)

"Charge" My Application Fee

Another electronic opportunity comes to mind regarding the transmission of the application fee. Many universities accept credit card payments for tuition and other fees. As an extension of this concept, a system could be developed that allows the prospect to call the university's 800 number (or a 900 number in tough fiscal years) and direct a fee payment via a major credit card. The acknowledgement number could be provided to the student for entry into the university's electronic application form, or the university operator could enter the fee payment into the admissions and the controller/comptroller/bursar system.

At Florida State, this process has been taken one step further by the development of a "private label" debit card system. The university has become a Bloomingdales or Burdines because it has its own credit card but uses a bank card processing center to handle all transactions, billing, and collections. This "Seminole Access Card" is like a VISA or MasterCard—it can be used in Automatic Teller Machines (ATMs) on campus or at participating banks throughout Florida. The card is also the university identification card complete with color, digitized photo impregnated into the plastic, and an embossed account number plus a magnetic stripe on the back and a smaller magnetic stripe for vending machines. Students can therefore conduct their financial affairs with the university via the banking network and deduct college expenses on their credit card (James and Norwood 1990, 1991).

The use of financial infrastructure associated with our credit card society has great application at universities. Whether using a private-label card or accepting Visa/MasterCards, these systems need to be integrated into the admissions fee payment process. This would make one more step electronic and speed up the process of completing the admission file. (This results in no checks

to process and fewer pieces of mail to be handled by the staff.) The only thing lacking in implementing such a step is the integration of the process into new, decentralized software.

A Voice Response Application

Presently, a touchtone telephone/voice response system is in use for registration and the scheduling of classes. Since registration and schedule adjustment (drop/add) is now a year-round operation, this 64-port system is in use almost daily. However, its heaviest use occurs during the first three days of each semester's drop/add period. The remainder of the time, the system has the capacity for other applications. Software is needed to make more comprehensive use of voice response systems that link all of the major student information systems and allows the university to present a unified image to the public.

Voice response units could be used to communicate (both ways) with the student about the admissions process. Properly tied into the proposed admissions software, an expert system would evaluate the application materials on an ongoing basis and build a file of those that are incomplete. Then, the voice response system software could poll the admissions system for a file of applicants who need to be called. The calls would be made automatically (like operatorless, automatic telemarketing systems) using "scripts" that advise the applicant to submit the missing items. It would be a nice touch to let the applicants know when all materials had been received and that they could expect to hear about an admission decision on or about a certain date. In a like manner, students could call the university voice response unit's 800 number and request the status of their application, using a Personal Identification Number (PIN) for security. So that this process does not become totally automated and perhaps impersonal, a "real" letter of acceptance should always be sent to the applicant.

Once the admissions decision has been reached, the applicant is taken to the next step of scheduling a campus visit as part of the Orientation Program. During orientation, new students are advised on registration and allowed to register themselves for the first time using the touchtone telephone registration system.

The Admissions Bulletin Board

Another variation on the use of a voice response unit to communicate with prospective students is an electronic bulletin board. With the growing use of personal computers, many questions could be asked by high school students and their parents through a link to the university. This access could be made from the high school or from home, using the university's 800 number. Admissions officials could respond to these questions on line and interactively by posting them on the bulletin board. They could even address a personal note to the student.

Interactive Video

There tends not to be too much demand for applicants to "sell" themselves in a personal, visual manner such as a videotape. However, on the margin, some students and universities might benefit from a video presentation on the part of the student. On one end of the spectrum, this would be true for students who are trying to be accepted as exceptions to the minimum numerical

standards. On the other end, there are bright and talented students who are seeking to optimize their scholarship opportunities. In these cases, students might be allowed/encouraged to "meet the admissions committee" via videotape or teleconferencing. The technologies are fairly well in place to make this a reality in a number of the large high schools and universities. But it would be expensive to implement on a statewide basis assuring each high school equal video access to the university of choice.

A real need exists for admissions officers to "sell" their university to each and every high school in the state several times a year. In the best of fiscal times, admissions staff can make only a few trips a year. Thus, video/teleconferencing offers a real opportunity for the university to present its "face" to prospective students. Ideally, in collaboration with high school counselors, the director of admissions could have quarterly teleconferencing appointments with interested students and their parents. These interactive meetings would be an opportunity to run a tape on the university, answer (before they are asked) the ten most frequently asked questions, and then follow these up with a question-and-answer period to give a personal touch to the process. (One private college in Florida sends a prospective student a videotape about the institution, upon request.)

Networking the Networks

As mentioned earlier, data and video networks continue to grow all across the nation. In addition to the data networks, Florida has a growing video conferencing network. Currently, the Commissioner of Education can be downlinked to all Florida school district offices. There is a similar satellite network that allows downlinking to all the 28 public community colleges and the nine SUS universities. The latest addition to Florida's downlink video conferencing capability is the installation of such facilities at each county's Department of Health and Rehabilitative Services (HRS) office (all 67 of them). As a supplement to the visits made by the admissions staff to the high schools, the director of admissions, utilizing the networks, could broadcast the latest on university programs and respond to questions from the schools.

Closing Thoughts

How do we pull all of this off? Although we have been taught to say, "Plan for nothing less than a fully-integrated, total management information system," might it be timely to suggest a piecemeal approach? Today, with budgets so tight they squeak, we have to find ways of identifying systems solutions that come in chunks rather than wholes. For example, we might have to be satisfied with installing an imaging system as a pilot project in admissions rather than holding out for a million-dollar, campuswide system.

But remember, significant improvement in information systems requires top-management support. We will probably need to "sell" the respective vice presidents on the importance of an integrated technology approach for the various functional operations. Yet, the VPs should carry the day with the president so that there is an institutional commitment for change.

Begin with an architecture, a strategic plan for administrative information systems. Sell the principle on step-by-step improvements. Demonstrate credibility with small success stories. Adopt lofty goals, such as:

- Stomp out paper. (Create a totally electronic entry system.)
- Place servers in departments for distributed systems.
- Empower users.
- Install smart/expert systems.

- Let computers do computing.
- Allow people to be personal.

The reality of life on campus is that most of our programmers have more than two years of backlog of applications work. Funds to "fix" information systems come in small (not large) chunks. However, all colleges and universities can identify some resources for change. For example, try to get commitments on such small steps as:

- Voice response systems
- Statewide networking
- Evolving to all on-line applications
- The "plastic" university
- Computerized advice systems
- The 800/FAX university
- Electronic bulletin boards galore
- Desktop mailings and publishing

In closing, here are a few words from the wise:

- New productivity applications may not increase productivity.
- Simple application tools may not be simple.
- Technologies which promise less work may not follow through.
- Although things will improve, nothing happens overnight (Golden and Eisenberger 1990)!

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An Introduction to EXAMINE: A Flexible Examination Scheduling System

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Introduction

Most university and collegiate registrars would agree that examination scheduling is a difficult and frustrating problem. We know of a few institutions where there are plenty of periods and lots of space, but they are rare. The survey by Carter [1986] covers the most significant practical work carried out until that date. This paper describes EXAMINE, a robust and flexible examination scheduling system suited to the needs of most educational institutions. The system was developed over many years as a joint project between researchers at the University of Toronto and l'Université de Montréal. Since Canada is officially bilingual, we chose the name EXAMINE as one of those rare words that has the same spelling and interpretation in both English and French.

The algorithm has evolved from the early work of Laporte and Desroches [1984]. A more complete description of the system and the applications can be found in Carter, Laporte & Chinneck [1992]. EXAMINE is intended to run on a PC using Windows, although we have also implemented it in a VAX environment (at Otago) and on a SUN machine under UNIX (at Carleton). In the next section, we will describe a typical working session with EXAMINE to illustrate the main features. We will then describe the details of its implementation at two Canadian universities.

An Overview of EXAMINE

The easiest way to explain the system is perhaps to follow a typical session (Figures 1 and 2). The screens that we have included here are based on our new Windows prototype. They are not finalized yet; however, they do give a good idea of what the system will look like soon. The actual EXAMINE program has been working for years; we are just giving it a new user friendly front end with an integrated data base system to support it. When users run EXAMINE, they will create a variety of files describing the restrictions on examinations, and the rules; these will be described below. These schedules can be saved, and the user can later change some of the parameters and run new schedules, or just move the dates for some of the old examinations.

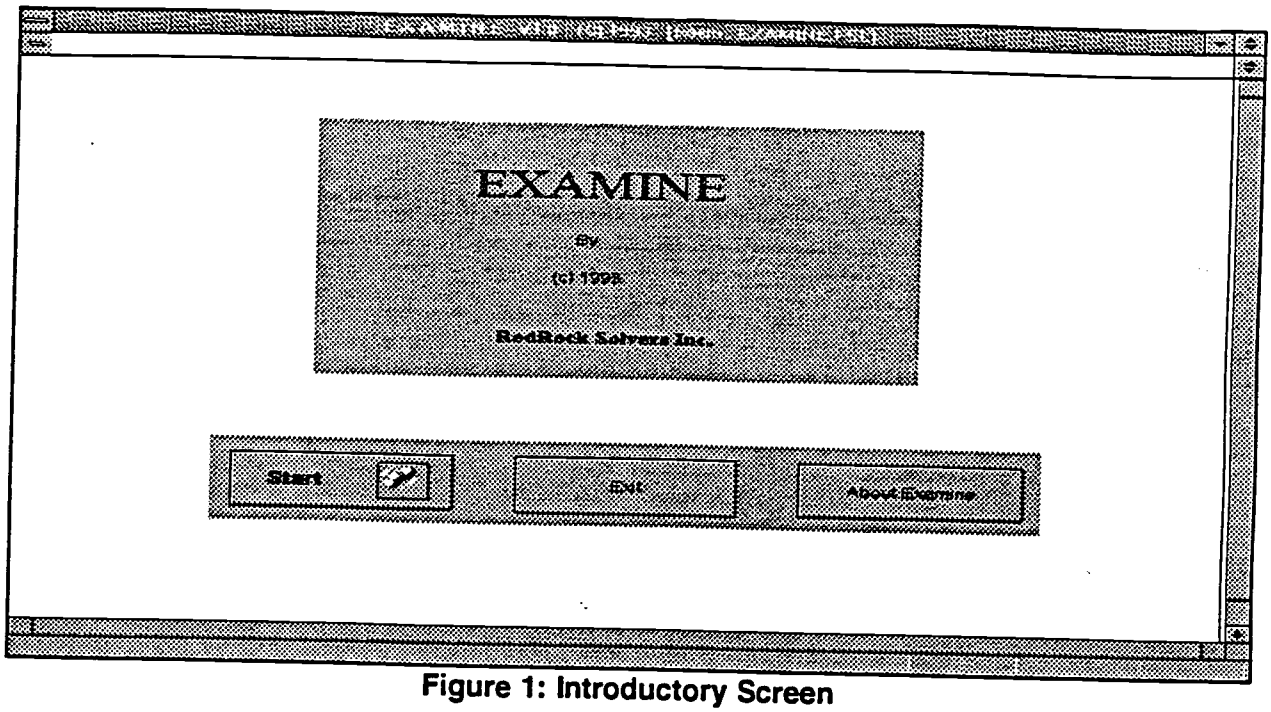

Figure 1: Introductory Screen

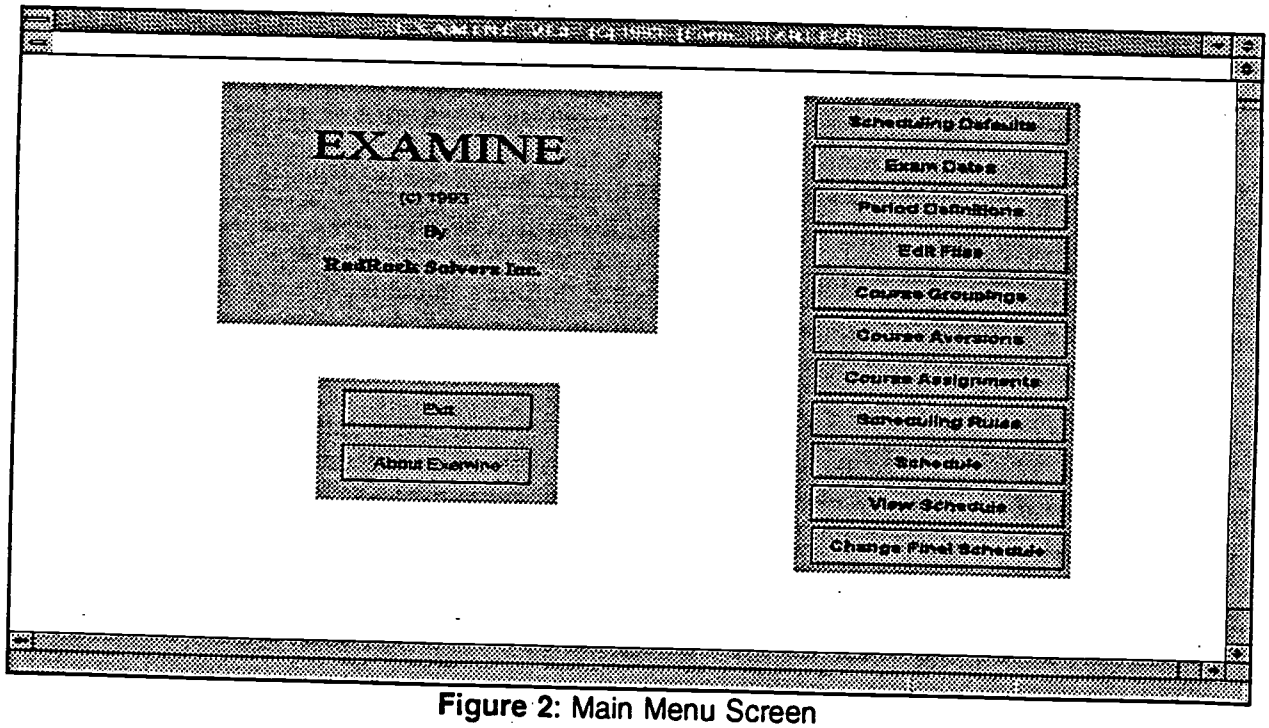

Figure 2: Main Menu Screen

Scheduling Defaults: EXAMINE has several scheduling parameters (Figure 3). The user can define the maximum number of seats available, the maximum number of examinations per period and the number of periods per day. It is also possible to store schedules and modify them later (Problem Name). There are also a couple of ways to influence the actual algorithm. The user can specify a *random number seed.* A random number is used in the scheduling program to break ties. By using a different number, you can get a new solution to the same problem. This allows the user to generate several answers and pick the best one. The user can also tailor the algorithm by selecting a *scheduling strategy*. The default strategy uses "maximum saturation degree." We find that it works best on most problems, but the user may wish to try other options.

Examination Dates: This screen displays the calendar for a selected month (Figure 4). The user can use the "arrow" keys or a mouse to select the examination dates.

Period Definitions: Initially, we define, say, three examination periods per day (Figure 5). Many schools define different "types" of periods as, for example, "morning," "afternoon," "evening," "weekend," etc. We often encounter rules such as certain exams that may only be scheduled in evening or weekend periods, or exams that must be scheduled in the morning. The EXAMINE system allows you to define a variety of different period types and then add period restrictions to specific examinations.

Edit Files: There are a few data files that are retained by the system. The user can easily make changes before running the timetable. These changes can be either permanent or temporary. For example, the user may wish to try several "What if?" scenarios, such as, "What if one of the rooms was unavailable?" These files include:

Student Data: For each student, the system keeps a list of all of their examinations.

Course Data: The user can add or delete courses. A course must be added (with an optional course title) before you can use the course number for any students.

Course Groupings: We frequently find that several different courses will have a common examination (Figure 6). In this case, we allow the user to specify, for each course, a single representative "common" course. These courses will then be scheduled as one single exam with the total enrolment of the individual pieces. The system allows the user to select courses from a list or just type in the names. Selecting the "Course Search" button will bring up a dialogue box allowing the user to enter a course name.

Course Preassignments and Period Aversions: Courses are often restricted to certain periods and the EXAMINE system handles this in three different ways. First, the user may select specific period(s) that the examination may be held in; no other periods will be allowed. Second, the user may specify a group of periods such as "evenings" or "weekday mornings" only. Third, the user may just have certain period preferences. We express these as "period aversions" (Figure 7). For example, the user may prefer that the exam not be in the evening, or that large exams not go in the last few days. When the user specifies an aversion period for an exam, the period(s) are still allowed, but the system tries to avoid them.

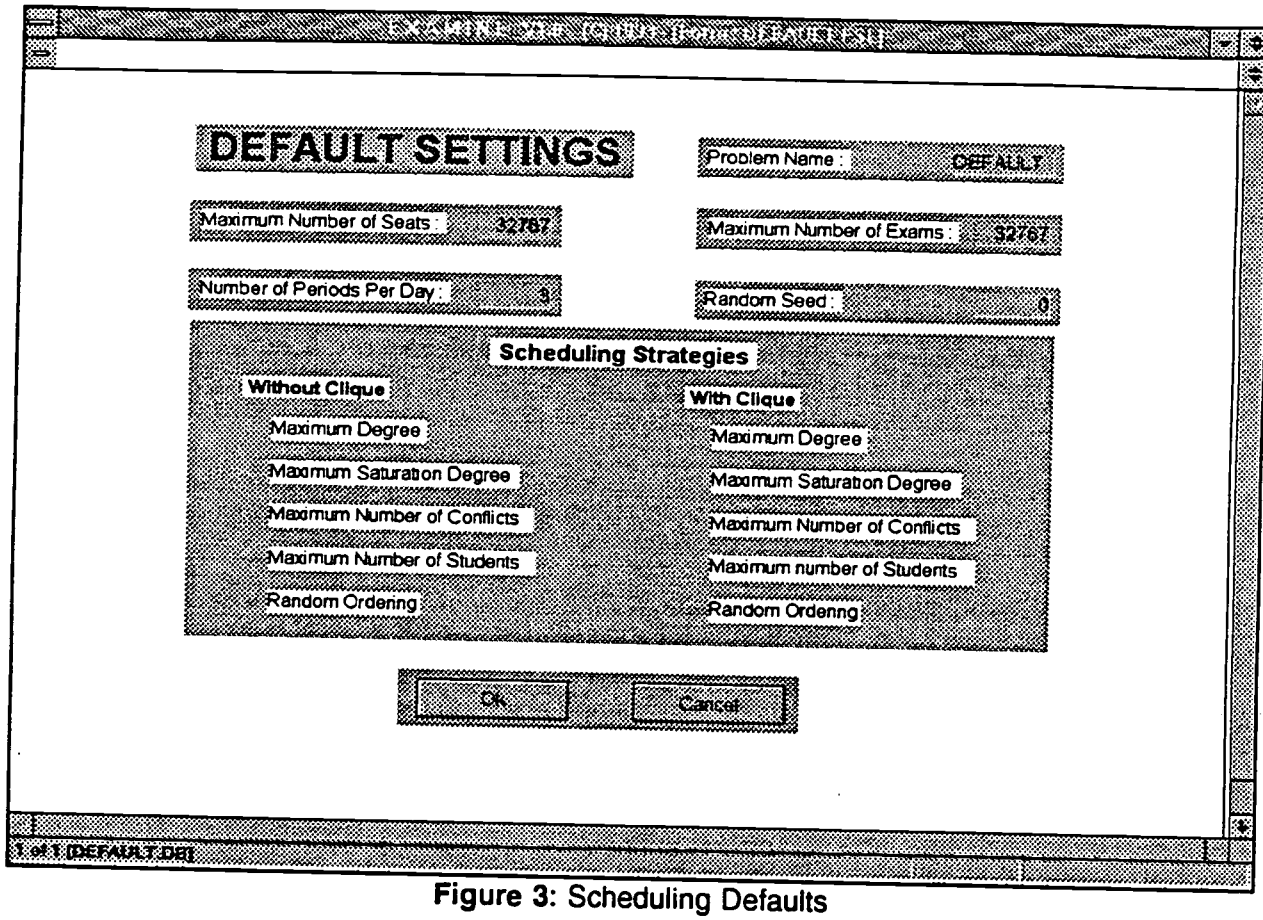

Figure 3: Scheduling Defaults

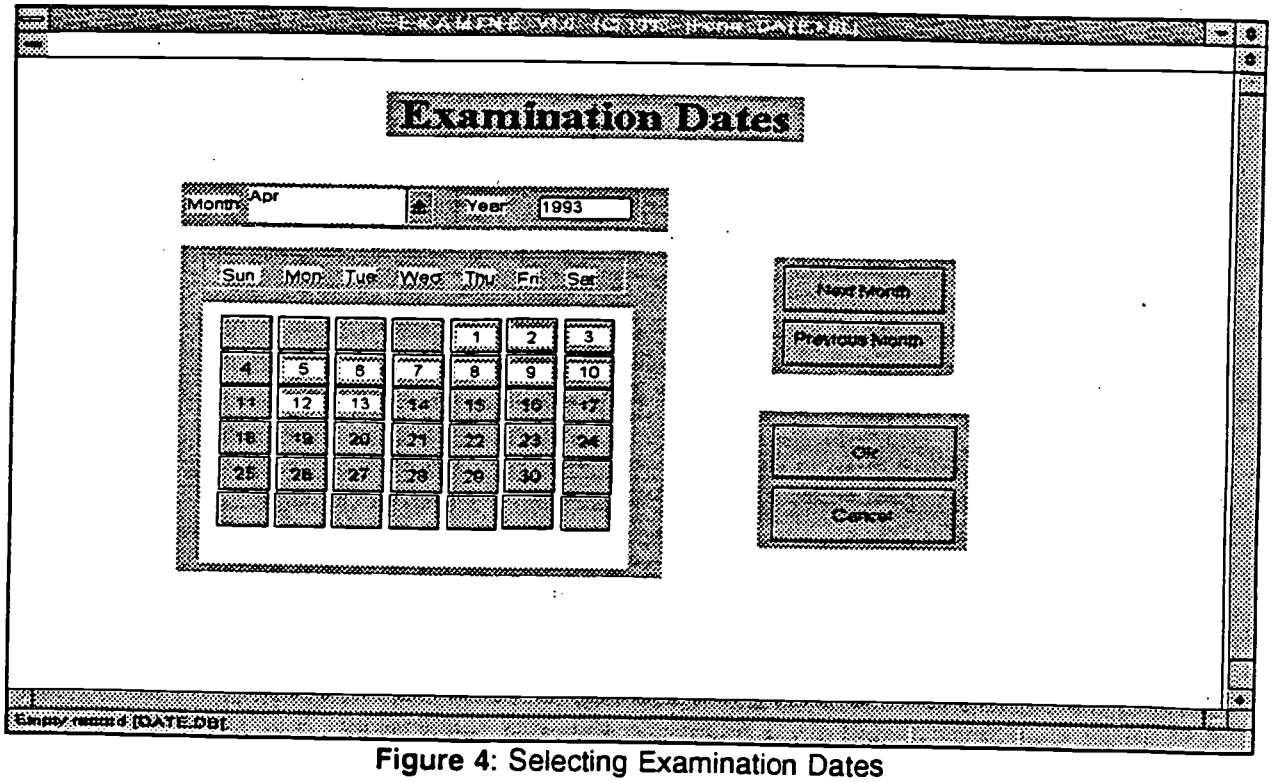

Figure 4: Selecting Examination Dates

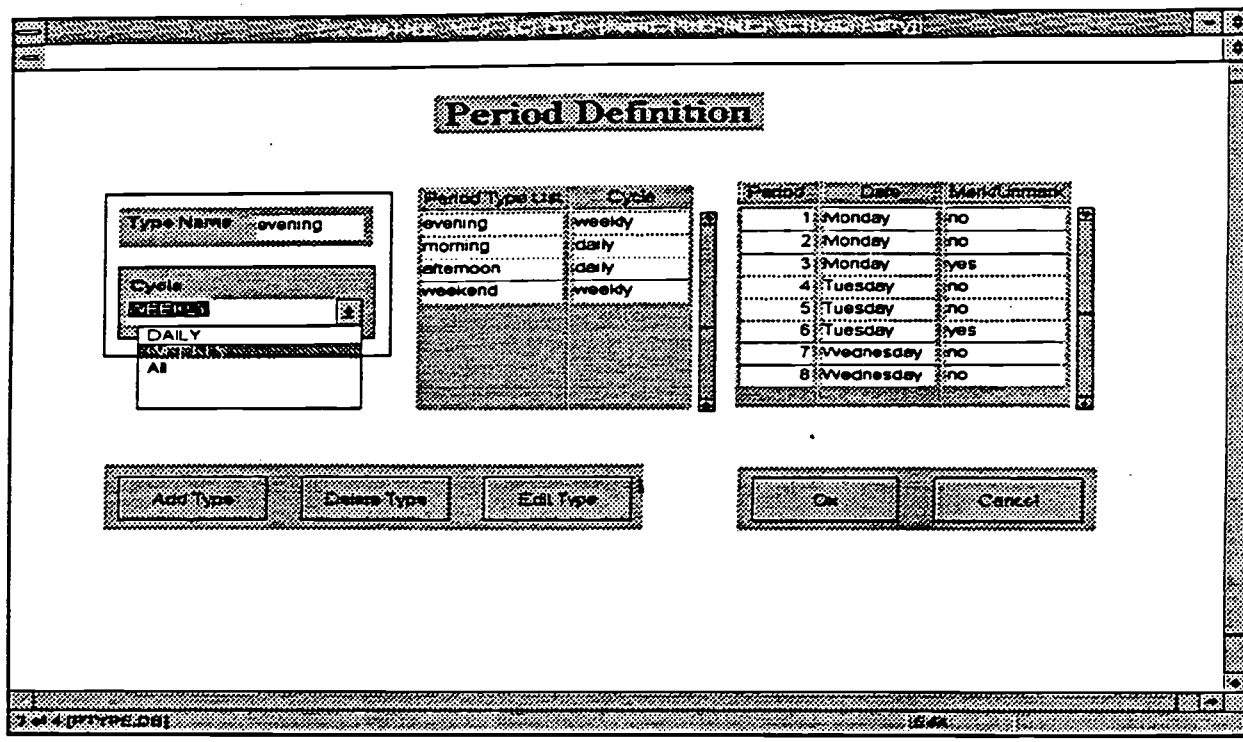

Figure 5: Define Period Types

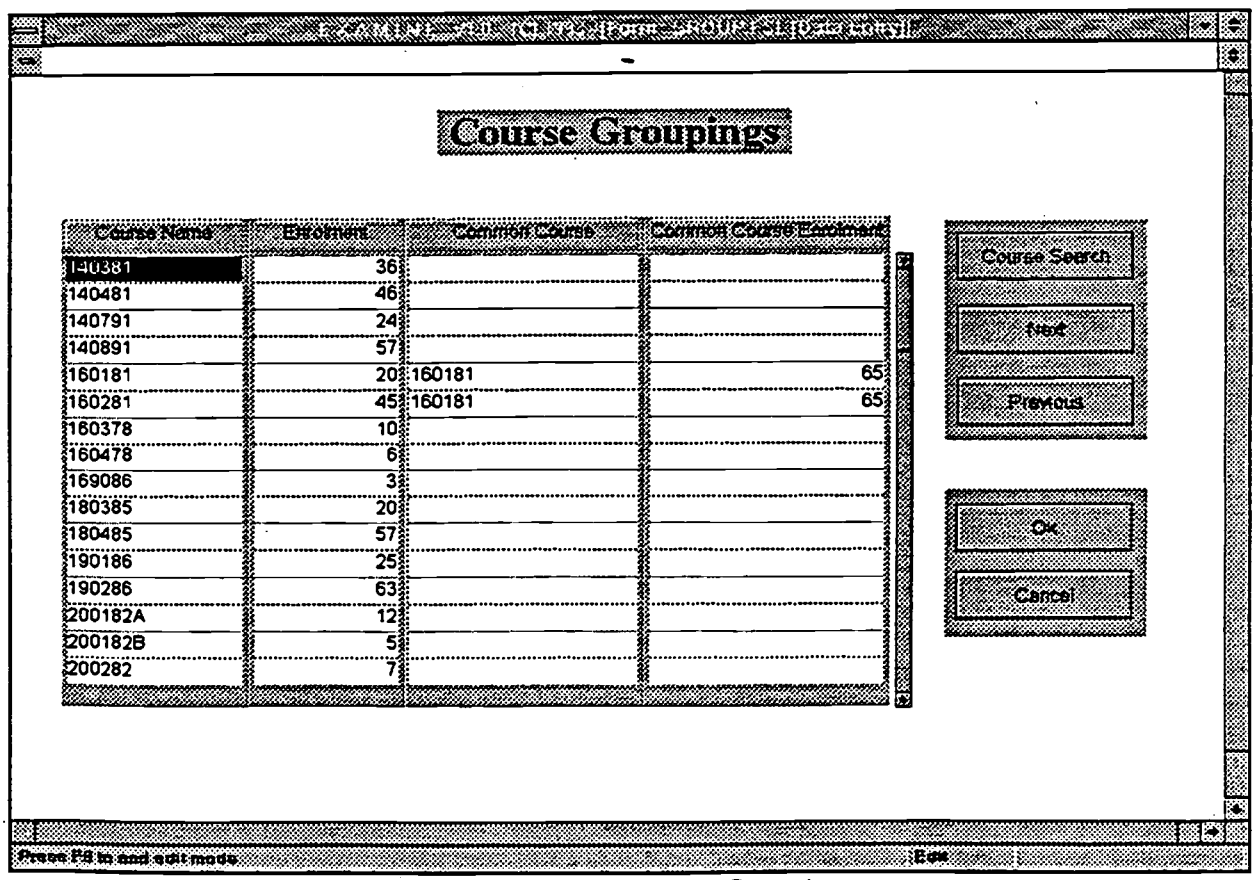

Figure 6: Define Course Groupings

Scheduling Rules: The only fixed rule in EXAMINE is that no student will be required to write two examinations in the same period. All of the other rules are controlled by the user and easily modified. The rules are all written in the form:

"No student shall have more than ***X*** examinations in any ***Y*** consecutive periods"

For example, some schools have a rule that "no student can have three exams in any 3 consecutive periods." We also allow a more flexible version of the rules where the school can "minimize the number of occurrences of two exams in two consecutive periods". Users fill in a table as illustrated in Figure 8. If they enter "-1," it means that the corresponding rule cannot be violated. They may also enter a "cost"; this value indicates the relative importance of violations of this rule. For example, in the figure, we have expressed the opinion that two exams in a row is twice as bad as two exams in three consecutive periods. This later feature allows the user to specify that they would like to have each individual student's examinations spaced out fairly evenly. Typically, we recommend (by default), that exams should be at least two days apart. Therefore, if there are three periods per day, we use a cost of "2" for two exams in six periods, "4" for two in five, "8" for two in four, "16" for two in three and "32" for two in two. This tends to provide a reasonable examination spacing.

Schedule: Once users are happy with their rules, they ask the system to find the best schedule. This program uses a very effective heuristic, as we will demonstrate when we discuss the applications. The criteria used for selecting the best schedule is based on minimizing the total "cost." This function is calculated by using the cost associated with violating any of the optional rules multiplied by the number of students who are affected. Hence, every possible schedule has a score (total cost) associated with it, and we can use that to try to find the schedule with the lowest score. The time required to construct the examination timetable depends on the speed of the computer being used and on the "difficulty" of the problem. We will define difficulty more precisely in the Discussion section.

Assign Rooms: EXAMINE includes an optional routine to find a feasible assignment of exams to rooms or groups of rooms. It is based on the rules expressed at the University of Toronto where each examination was required to have its own room, although some exams were so large, that they required two or more rooms that were physically close. In order to model this requirement, we allowed the user to define a set of "room groups." For example, room 110 has 40 seats, and room 111 next door has 35 seats; the user can specify that rooms 110 and 111 can be combined, if necessary, and treated as a single room with 75 seats. The system is clever enough to recognize that this group can only be used if both of the individual rooms are empty.

This structure can be extended to allow more complex situations. For example, at Toronto, there were several rooms which were marked off in alternating desks (with blue or gold stickers). We can then define two different "rooms" called 110-blue and 110-gold, each of which has 20 seats. Clearly, by using the room group definitions, 110-blue and 110-gold would never be used for the same examination.

View Schedule: After the schedule has been created, the user can look at the results in several different ways. They can display a simple list of all of the examinations showing the date and time for each one. The user may also wish to look at all of the examinations

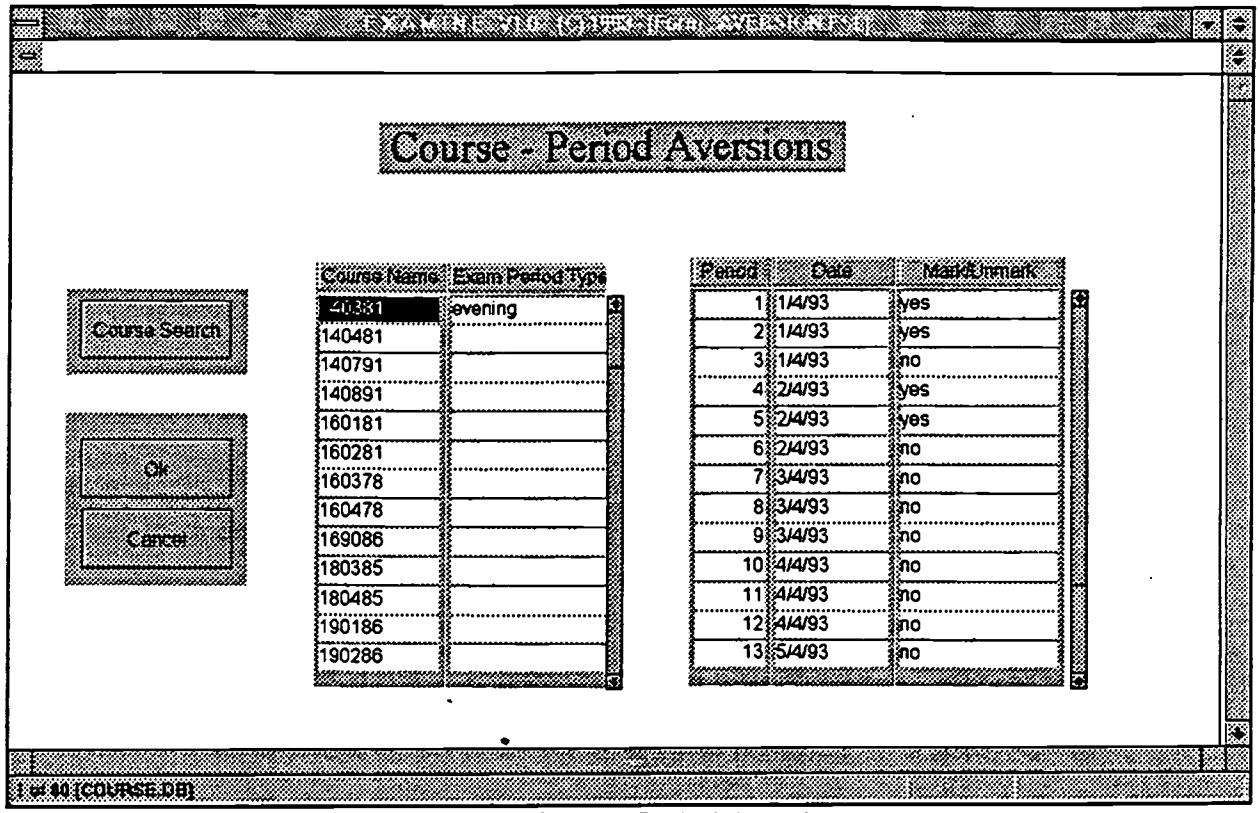

Figure 7: Course Period Aversions

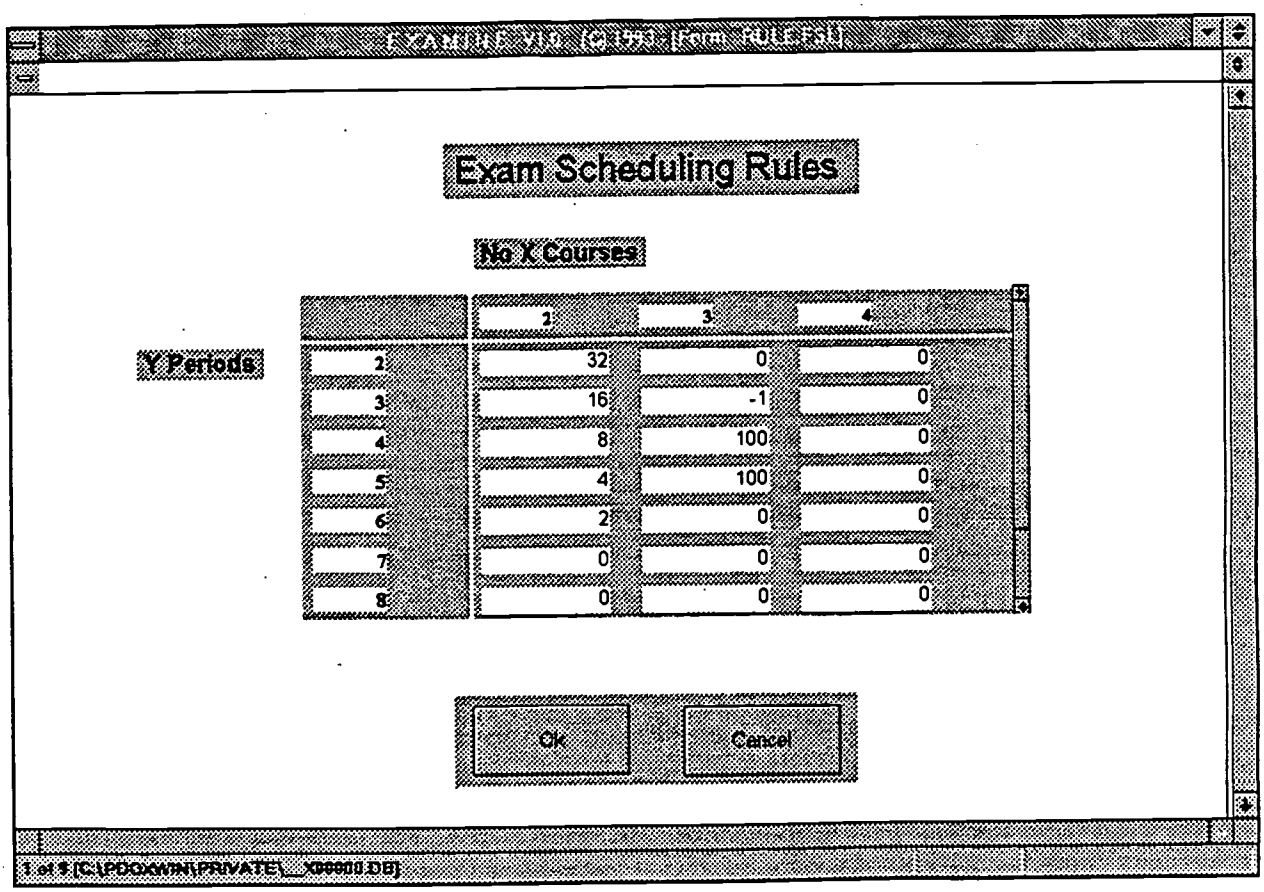

Figure 8

scheduled in any particular period. The system produces a file listing all of the courses and the date and time of each examination that can be used for a variety of customized reports.

Change Final Schedule: We usually find that the EXAMINE system produces feasible schedules that can satisfy all of the requirements (Figure 9). However, it still happens occasionally that one or more of the exams must be moved. If this happens before the timetable has been posted, it is probably best to use the preassignment function to force the exam into certain periods, and then rerun the timetable. However, after the timetable has been sent out, minimum changes should be made. The Move function allows a particular examination to be selected from a list, and displays a profile of the all examination periods illustrating graphically what the "cost" would be for each alternate choice.

The University Of Toronto Engineering Faculty

The University of Toronto is the largest university in Canada with over 50,000 students. Unlike most smaller institutions, Toronto has a relatively decentralized administrative structure; each faculty has its own Registrar and does its own scheduling of courses and examinations. The Faculty of Applied Science and Engineering has about 2,400 undergraduate students taking nearly 200 Engineering courses each term. Engineers also take a large number of courses from the Faculty of Arts and Science. These courses are prescheduled by Arts and Science, and are then treated as conflicts in Engineering. The timetable for Engineering covers ten working days (Monday to Friday over two weeks), two periods per day (morning and afternoon). Each exam is two and a half hours long with a two and a half hour break between morning and afternoon exams.

Prior to 1989, the Engineering Faculty scheduled examinations using a computer-assisted method that was developed in-house. Basically, the system used last years timetable with an interactive routine that allowed the user to look for conflict free time periods for problem exams. The method was never totally successful, and there were always a dozen or so students who had direct conflicts (two exams in the same period). These students were assigned to a special *clash room* where they would begin their first exam before their classmates, and then start the second one after a short break. This arrangement was not very popular with students, but it appeared unavoidable. When the EXAMINE system was implemented in the Fall of 1989, all direct conflicts were eliminated.

It was interesting that the EXAMINE system was used to make some major changes to Faculty policies. In particular, prior to 1989, first and third year exams were always scheduled in the morning, and second and fourth year exams were in the afternoon. This structure was designed to ensure that most students would never have two exams on the same day. Of course, there are many third year students taking fourth year courses, etc., but the *normal* student should have a good schedule. Furthermore, the Faculty decided to give first year students an additional break in the Fall term. Since they all take the same common six exams, they can be preassigned to every second day to give them a perfect two day spread between exams.

Unfortunately, there is also a chronic shortage of suitable examination rooms. Students need a decent table and chair style space to spread out their papers. The scheduler estimates that we can normally only schedule about 850 students to write exams in any one period. This

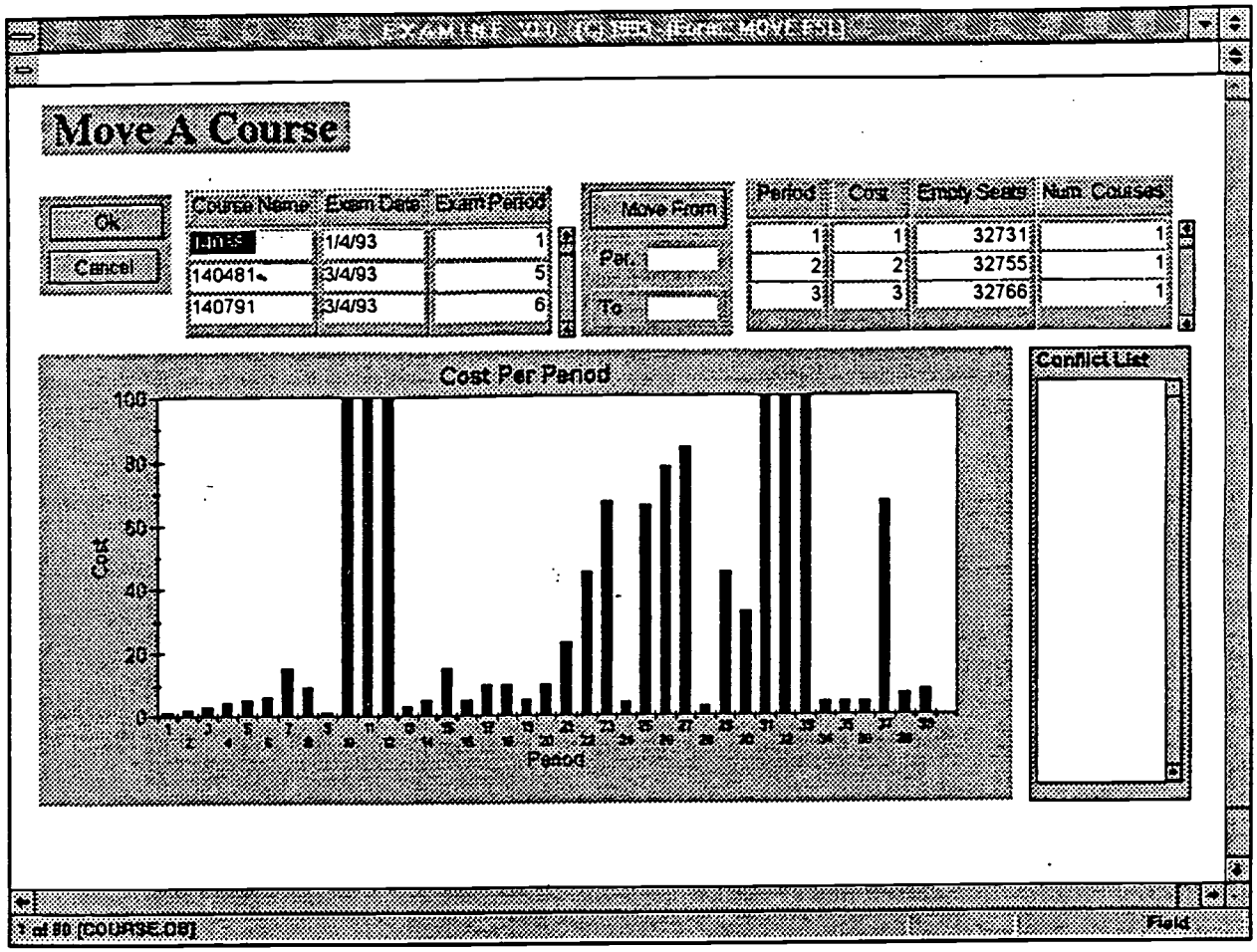

Figure 9

lack of space creates two very serious problems. Consider the schedule for the ten morning periods with six periods preassigned to the 700 first year students on Monday, Wednesday and Friday. This leaves very little space on those days for the third year students, and only four days really open to them, on Tuesdays and Thursdays. Moreover, third year students tend to have a large number of elective courses, so they really need far more examination days than the first year students! To obtain a conflict free schedule, the third year students require the full set of twenty periods instead of four.

Using the EXAMINE system, we were able to convince the Associate Dean that the morning and afternoon division was simply a bad idea. We ran schedules using the forced separation, and then ran new schedules where the second third and fourth year exams could move freely. (First year exams were still fixed.) The new results were so much better that we were able to sell the idea to the Faculty and change a long standing practice. We were also able to convince the Associate Dean to let the first year exams float a little. It is much better to let the system determine the best possible place for each examination. The large size of these courses, and the underlying cost structure of EXAMINE, will automatically give a high priority to evenly spacing first year examinations.

The shortage of acceptable examination space created a second major problem. Under the old system, the scheduler would post the preliminary timetable, in each of the departments, and try to accommodate requests for changes. There were always several requests since the timetable contained conflicts. After the deadline to make changes, the timetable was considered "fixed," and the scheduling officer would then manually attempt to assign the examinations to acceptable rooms. This frequently resulted in an eleventh hour panic with no space for examinations that were now required to occur on the scheduled day and time.

In response to this, we developed a room assignment module that tries to find a room for each exam before we post the preliminary timetable. If the program cannot find a feasible room combination, the scheduler can move some of the exams manually, or rerun the EXAMINE program with fewer exams allowed in each period. Therefore, when the preliminary timetable is posted, it is now conflict free and feasible. There are virtually no changes allowed anymore (unless there were serious data errors that caused conflicts to be missed).

One of the problems at Toronto is that the Faculty of Arts and Science, with over 21,000 students and over 800 final exams does their timetable first; and then, other faculties and colleges find a timetable which tries to avoid conflicts that their students have with Arts & Science courses. During the summer of 1993, we ran several successful tests using EXAMINE to solve the much larger Arts and Science problem. We hope that it will be accepted by the Faculty, and perhaps later, we can consider running everyone's problems together as one.

Carleton University

Carleton University, located in Ottawa, has about 21,000 students in some fifty disciplines grouped into four faculties. In December 1992, there were 739 examinations, involving 55,522 student-exams. In April 1993 there were 880 exams involving 60,700 student-exams. The examinations are supposed to be completed in 12 days, using three periods per day, Monday through Saturday (i.e., two full weeks). The main constraints are that no student can have 3

exams in a row, or four or more exams in any five consecutive periods, or five or more exams in any seven consecutive periods. Other constraints relate to the time slot in which certain exams can be scheduled. A maximum of 1550 seats is normally available.

Carleton grew rapidly during the 1980s, causing serious problems in scheduling the academic year. The Fall term is the most difficult. Between Labor Day and the beginning of the Christmas holidays, time must be found for orientation and other first week activities, 13 weeks of lectures, a grace period before exams, and the examinations themselves. The existing examination scheduling software was finding it extremely difficult to schedule the exams into the time available, so in 1990-91, the university was forced to adopt a shorter 12 week lecture period to allow sufficient time for the exams. Even under these relaxed conditions, the software scheduled exams over 15 days in the Fall term, and 17 days in the Winter! The sudden change in the length of the teaching term proved very difficult for professors and students trying to cover the same material in one less week. In 1991-92, the 13 week schedule was reinstated, but starting one week early.

The problems caused by these drastic changes to the teaching schedule led the Vice-President (Academic) to strike a Task Force on Academic Year Scheduling. After conducting a survey of examination procedures at other Ontario universities, the Task Force determined that it should be possible to satisfy all constraints in a 12-day examination period. Experiments using the difficult 1991-92 data, showed that EXAMINE was able to find a feasible 12-day exam schedule for the fall term, and a 13-day schedule for the less critical Winter term. The Fall term schedule required 1667 seats, but we discovered that extra rooms were available if necessary. Moreover, one exam had an enrollment of 1667 students!

As at Toronto, the use of EXAMINE instigated some policy changes at Carleton. Courses taught on Instructional Television (ITV) were formerly prescheduled late in the examination period to allow the maximum time for tapes of the final classes to reach distant ITV students. Using EXAMINE, we were able to show that these preassignments were lengthening the examination period significantly. The adoption of the 12-day examination period policy was partly based on the success of the EXAMINE experiments.

Discussion and Conclusions

Between 1982 and 1993, the authors have developed a general examination scheduling system that has wide applicability. The special characteristics of EXAMINE contributed directly to its adoption by a number of institutions. Foremost among these is its flexibility in allowing various rules and weights to be expressed and modified to create different scenarios.

The experiences with EXAMINE at Toronto and Carleton taught us a few things about selling Operations Research tools. First, nothing convinces a client better than experience with their own exact problem. With EXAMINE, people can send us their data in an easy to create format (basically, a list of course names for each student), and we can show them what it will do for them. Second, because it is easy to change the rules and try different scenarios, EXAMINE was useful in providing insight as to which policies were really causing problems within the school. This analysis capability is very important to help decision makers select the most appropriate course of action. Finally, the tool must be easy to use. EXAMINE presents the user with simple windows, uses a mouse to select options, and helps the user avoid mistakes by maintaining data integrity.

There must be hundreds of examination timetabling programs that have been written and can be purchased. The program that was being used at Carleton before 1992 is typical; it looked for "the most difficult" exam and tried to find the best available period. We believe that it is important to recognize when a problem is difficult. For any given example, there is some absolute minimum number of periods for which a feasible solution exists. If, for your problem, you are very close to this minimum, then your problem is difficult. If you have a few extra days beyond this limit, then almost any reasonable timetabling program will solve your problem. When your problem starts to get close to the minimum, you need something better. As illustrated by the Carleton results, the EXAMINE system is able to find feasible solutions in fewer periods than conventional techniques. Having said this, we have also noticed that people tend to ask for as much as the system can give them. For example, in Toronto, everyone accepted conflicts as inevitable, until the software showed that they were not. Then people wanted more. You can always expand your demands to the limits of the software and make any problem difficult.

As of April 1993, several universities have been using EXAMINE for their timetabling problems including Toronto (Engineering), Carleton, the London School of Economics and the University of Otago, New Zealand. Several other schools are considering adopting the program when the new version running under Windows is ready in the summer of 1993.

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New Staff Orientation
The Second Step in Insuring
Your Students Get Quality Service

Doug Hartnagel
Dean of Enrollment Services
University of Massachusetts, Boston

Introduction

We demand a lot from the people who work in our Admissions and Registrar offices. Therefore, we have an obligation to ensure that we properly prepare them for their responsibilities. An orientation program used successfully by one institution will provide a framework other institutions can adapt in the development of a new staff orientation program.

A Brief History

In 1983 the Dean of Enrollment Services at the University of Massachusetts at Boston formed a project team to come up with an orientation program for newly hired staff within the Office of Enrollment Services. A project team is different from a committee or task force. A project team has a very narrow charge, with a very short timetable to complete its work. This project team had four weeks. Project teams dissolve immediately upon completion of their task (somewhat like the tape in Mission Impossible). There is no attempt to get a representative membership on the project team. Instead, its membership is always small, has expertise in the matter at hand, and always has at least one person who might have to implement the results.

The call for a project team to develop an orientation program was not a casual happening. The year 1983 saw some major changes in the way that the Office of Enrollment Services (OES) interacted with all students. Service now became a strategic marketing weapon in both the recruitment and retention of students.

In the formulation of a new philosophy on quality service, it became clear that a key starting point to orientating staff about the importance of service was when they first joined the organization. The program described here is not the same program that the project team recommended. The original program has been modified a number of times; each change improved on the original program.

The Office of Enrollment Services at the University of Massachusetts at Boston consists of five departments: Undergraduate Admissions, Registrar, Financial Aid Services, Graduate Admissions and Records, and Student Information Services. An administrative assistant in the Dean's Office coordinates the orientation program.

The Orientation Program

The First Step

Orientation of new staff should begin with the hiring process. As part of the interview process, applicants should be briefed on the service philosophy of the organization, as well as the organization's staff development program. Ideally, an applicant should be given an opportunity to observe how the position for which they are applying works.

The Colleague

Each department has an individual called a "colleague" who is trained to meet the needs of new staff. These individuals will serve two purposes. First, when an individual is hired, that department's colleague becomes a companion of sorts for the first few weeks, providing an introduction to the department, Enrollment Services, and the university. Also, in its most basic form, the colleague becomes a friendly island in a strange environment who will make the first few days of employment much less intimidating. Second, colleagues in other offices become the new team member's contact in those respective departments. Outlined below are some of the responsibilities of the colleague:

1. Familiarize the new staff member with the office, its role, and function. Introduce the office staff. Explain what each staff member does and how the team member relates to each of them. Introduce this member to information slowly and in a manner that will allow him/her to gradually absorb the information. Make the new staff member comfortable with both the office and the office staff. This cannot be the burden of the colleague alone. All staff must be aware of their responsibilities in making new staff welcome and accepted as part of the team. New staff should be involved in conversations, coffee breaks, lunch groups, etc., until relationships develop naturally.

2. Familiarize the new team member with the other areas of OES. Explain the general function of each office and how each interrelates to provide a vast range of services to clients. During this period, introduce the new

staff member to colleagues in the other areas of OES who will be the contact people in their respective departments during the initial phase of employment. They will then have one person they can identify with and feel comfortable with in each department. These colleagues will provide them with information and direction until they become familiar with the various departments and staff.

3. Arrange a tour of the campus through the existing tour program. Having the new staff member take the same tour as prospective students avoids duplication of effort and gives the new staff member a student's perspective of the campus.

4. Take new staff members around to various university offices and help set them up as employees.

    a. Call Personnel and ensure all paperwork has been completed.
    b. Get keys from the Physical Plant.
    c. Get an authorization code for terminal access.
    d. Help him/her get an ID card.

Colleagues must be volunteers willing to assume these responsibilities with a sense of excitement. Their period of service as a colleague should be stated before they assume that duty. Staff who serve as colleagues can elect to extend their service if they enjoy the role or be replaced if they have grown tired of the function.

We recommend that one individual coordinate the colleague program and all other facets of orientation. For this part of the orientation to be successful, supervisors must be supportive. They must understand the time commitment involved during the first few days of the new staff member's employment.

The Program

Since all OES staff have either a direct or indirect impact on whether students enroll or, once enrolled, persist, it is imperative that the orientation program give the new staff member a solid foundation in the philosophy of the organization, its policies and procedures.

Phase one of the two-part orientation starts with a one-day program that introduces the new team member to the culture of OES, and to the role OES plays in the university's mission. The day starts off (over coffee and Danish) with an informal discussion with the Dean and the new team members. The discussion generally includes sharing information on the participants, including the Dean. The goal is to learn that everyone is a real person with interests beyond the workplace.

A description of phase two is given to the new team members with an explanation as to why this type of program is conducted. The Dean describes the history of OES and its relationship with the overall mission of the university. A discussion about service shows the importance OES places on service, and encourages new team members to make suggestions and share ideas. Each new team member is given a copy of the various publications used in OES. The morning ends with a briefing (by the Associate Dean) on security. The new team members are informed about OES' security policy on hard copy and computerized records, responsibilities of all members of OES, and the procedures to follow to insure that security is not compromised. This phase ends by the Dean taking all new team members to lunch.

Phase two is a sixteen-week program that introduces the new team members to a different subject each week. These subjects range from programs, policies, and procedures within OES to programs of other university departments. To try to attempt to describe these activities in a one-day orientation would result in about a ten percent retention of material three weeks later.

The new team members meet once each week for an hour and a half. At this meeting a "presenter" from a particular department describes either a program or policies and procedures of a particular activity. The following is a sample of a typical sixteen-week program. It is not necessarily in chronological order.

1. Student Information Services: New team members will learn how the information specialists respond to telephone inquiries from prospective students.

2. Who are our students? Where do they come from and why do they come here? How were get them to come (recruitment activities)?

3. Admissions: Unveiling the mysteries of how we process and select new students. Application processing at both the undergraduate and graduate level will be discussed.

4. Orientation and Placement Testing: How it works and why it is important.

5. Financial Aid (Part 1): What is financial aid? What are the different kinds of financial aid available?

6. Financial Aid (Part 2): Filling out the FAF. Who is eligible? Describe the process for applying.

7. Registration: Advance, late, and everything in between.

8. Academic Regulations and Degree Requirements: A briefing on the

important academic regulations, what it takes to get a degree, and the degree audit.

9. Scheduling and the Academic Calendar: How scheduling works for both classroom and nonclassroom space. And explanation of how the academic calendar impacts OES.

10. Billing: Who pays what and why? Who does one pay and why?

11. Academic Programs: What are some of the programs available? What is the difference between a major, a certificate and a concentration?

12. Other Departments: Some of the key offices on campus and the services provided students. Why are they important to OES?

13. Campus Life: What is campus life like at UMass/Boston, and how can a staff member make full use of it?

14. General Information Session: New team members will sit in on a general information session with prospective students and their parents.

15. CPCS: New team members will sit in on a CPCS admissions information session.

16. Wrap-up: The final week will be with the Dean of Enrollment Services to provide him with feedback about the orientation program. This information is used to enhance the program.

Attendance is mandatory. The individual's supervisor (not the team member) is responsible for seeing that there is adequate office coverage during the new team member's absence from the office.

New staff joining OES in the middle of an orientation cycle will join the program the second week they have started work. For example, if a new team member's first session is session number nine, then their sequence will be 9-15 and 1-8 and 16.

Presenters for each session will be required to prepare in advance an outline of their session. The outline should include materials to be covered and a description of the interaction to be used in the presentation. The sessions will be interactive and upbeat, giving the attendees an opportunity to actively participate in the discussion. They are not to be lectured to for an hour and a half.

The goal of these sessions is not to make experts out of the attendees, but rather to familiarize them to an extent that will provide the foundation for

further follow-up if the need arises. In an hour and a half, a new staff member can't learn all there is to know about recruiting students. They can get a flavor of the different activities the university engages in, so that they have some frame of reference.

The same is true for financial aid. An hour and a half will not make anyone an expert; in fact a year and a half probably won't do it. However, if part of the orientation session requires that staffers fill out a financial aid form, using a fictional set of numbers supplied to them, they quickly get an appreciation of what students must endure.

Summary

This session described how one organization in one institution recognized that a well-informed and properly trained workforce begins with new staff orientation. Every organization develops its own corporate culture. Therefore, a well thought out orientation program can insure that new staff begin on the right foot.

The program described here was directed specifically to enrollment services type operations. However, the general concept can be adapted to any administrative unit within an institution.

A surprising outcome of this program was how many veteran staff members asked to participate in the program. When the program started, the veteran staff members quickly saw how much information the new staff members were gaining. They saw that new staff were able to serve students with an air of confidence generally unheard of with new staff. It is suggested that veteran staff be offered the opportunity to attend these sessions.

The keys to a successful orientation program are having a staff person to coordinate the program, monitor constant feedback from those that are going through the program, and remaining flexible enough to make changes and adjustments when necessary. Direct access to the dean or director of the administrative unit is also helpful.

The men and women who work for us are the most important resource your institution has. As managers, we are responsible for providing them with the skills necessary for them to do their job in a quality manner. An orientation program of this type is an important element in fulfilling our responsibility.

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