



EMBRY-RIDDLE
AERONAUTICAL UNIVERSITY

Extended Campus

College of Career Education

Sixth Annual Symposium

on

Teaching Effectiveness

Presented by University Faculty

November 4, 1998

Daytona Beach, Florida

Table of Contents

<i>Introduction.....</i>	<i>ii</i>
<i>Assume Nothing! Expect Anything!</i> <i>Preparing for an Interactive Classroom</i> By Rebecca Rutz, Amy Chatigner, Paul Morgan, Dr. Alex Carter.....	1
<i>A Systematic Methodology for Keeping the Teacher in the Learning Process</i> <i>While Utilizing New Technology Tools</i> By Dr. Melvin Anderson.....	11
<i>Teaching and Technology Techniques for Teachers</i> <i>In Online Learning Environments</i> By Sallie Johnson.....	30
<i>Tech"Knowledge"y Anxiety</i> By Dr. Wm. Francis Herlehy and Dr. Merodie Hancock.....	56
<i>Using LISTSERVS as Instructional Tools in the Modern College Classroom</i> By Dr. Ron Clark.....	68
<i>Guidelines for Using Study Groups Effectively</i> <i>In Teaching and Learning</i> By Dolly Secrist.....	79
<i>College Level Teaching Effectiveness</i> By Dr. Mark Bellnap.....	102
<i>Challenges in the Modern College Classroom:</i> <i>Balancing Psychological Needs and Academic Rigor</i> By Kathleen Ringenbach.....	110
<i>Colleagues in Community</i> By Dr. Wendy Gans.....	119
<i>"Wild Ideas" Sessions in Teaching Astronomy Courses</i> By Dr. Vladimir Airapetian.....	131
<i>International Student Self-Selection into the Introductory Speech Course:</i> <i>Spring 1995-Spring 1997</i> By Mark Wright and James Cunningham.....	139
<i>Teaching with Technology in the Modern Classroom: A Learning Systems Model</i> By Dr. Gary Schornack and Dr. Charles E. Beck.....	149

Introduction

Each year the Faculty of the Embry-Riddle Aeronautical University College of Career Education sponsors a symposium on teaching effectiveness. We do this to encourage the sharing of research and experience concerning how to improve our effectiveness as teachers.

In our realization that there are no panaceas in teaching, that neither subject matter competency or teaching competency nor competency with the “gadgetry” of modern presentation technology are sufficient conditions for effective teaching, we encourage this exchange of experiences and ideas.

We hope that the readers will profit from this exchange and will consider submission of papers for presentation at the next symposium.

S. Earl Wheeler, Ph.D., Chairman, Faculty Development Committee

Editor in Chief, *S. Earl Wheeler*

Production Editor and Production Manager, *Traci Vinson*

Symposium Arrangements and Facilities, *Ann Fagan*

Jury:

Dr. Vance Mitchell

Dr. Ronald Clark

Dr. Alan Bender

Dr. Earl Wheeler

Dr. Frank VanderWert

*Assume Nothing! Expect Anything! Preparing
for an Interactive Classroom Experience*

**ASSUME NOTHING! EXPECT ANYTHING!
PREPARING FOR AN INTERACTIVE CLASSROOM
EXPERIENCE**

Mrs. Rebecca Rutz
Business Instructor

Mrs. Amy Chatagner
Business Instructor

Mr. Paul Morgan
Business Instructor

Dr. Alex Carter
Assistant Dean of Learning Resources

**MISSISSIPPI GULF COAST COMMUNITY
COLLEGE
JACKSON COUNTY CAMPUS**

**The Sixth Annual Symposium on Teaching Effectiveness
College of Career Education
Embry-Riddle Aeronautical University
Extended Campus**

May, 1998

**ASSUME NOTHING! EXPECT ANYTHING!
PREPARING FOR AN INTERACTIVE CLASSROOM EXPERIENCE**

Abstract

Interactive distance education is a technique of providing real-time instruction to learners who are located at a remote site from the instructor. Through the technology of interactive distance education, the instructor and learners have the ability to both see and hear each other during the instructional process regardless of their geographical location. This real-time interactivity among several remote sites is the major instructional advantage of this form of distance education. The purpose of this presentation will be to provide information concerning the effective planning and delivery of business courses via an interactive distance education setting. There were four different classes utilized for this project that included Cost Accounting, Income Tax Accounting, Principles of Business Finance, and Entrepreneurial Problem Solving. These are vocational/technical classes which are required within the Business and Office Technology major of Mississippi Gulf Coast Community College. All classes had both on-site and remote site students enrolled. The presenters will provide information based on both practical experience developed during the instructional process and current research within the area.

**ASSUME NOTHING! EXPECT
ANYTHING!
PREPARING FOR AN INTERACTIVE
CLASSROOM EXPERIENCE**

Interactive distance education is the technique of providing live instruction from an origination site to students at the origination site and also located at one or more remote sites. In this type of distance education, the remote sites are geographically separated from the origination or broadcast site. This process utilizes both video and audio for real-time communication between all sites on the network. The video and audio signals are usually transmitted in compressed video format on communication lines such as a T1. In this way the individuals at all sites can see, hear, and actively participate in what is happening at all other sites on the distance education network.

Embry-Riddle Aeronautical University consists of many residence centers and locations. This system, we believe, would be of great benefit to Embry-Riddle Aeronautical University and to their students at their many locations.

This presentation is based on an analysis of various technical business courses which have been offered by the Mississippi Gulf Coast Community College district through an interactive distance education network. This network, the Community College Network or CCN, is based throughout the state of

Mississippi. There are 24 sites on the CCN system which consists of all two-year colleges in the state and also includes the Cooperative Extension Service at Mississippi State University and the University of Mississippi medical Center. The primary purpose of CCN is concerned with advancing the quality of rural health activities and general education within the state. Classroom instruction through the various member sites is a secondary, but equally important component of the system. Almost all CCN sites have either originated or received some type of instruction since the development of the system in 1994.

The requirements for planning and delivering a technical business course over an interactive distance education network are not completely the same as in a traditional instructional setting. Therefore, the information provided in the presentation will look at those different requirements for instruction and their impact on the planning and teaching of interactive courses within a vocational/technical business curriculum. The four courses which were the basis for this presentation included Cost Accounting, Income Tax Accounting, Principles of Business Finance, and Entrepreneurial Problem Solving. All but the Cost Accounting have now been taught at least twice on the interactive network. It should also be noted that most courses have only been offered to students within the Mississippi Gulf Coast Community College system.

ADVANTAGES

There are several advantages to offering technical business and accounting courses on an interactive distance education network. These advantages would apply to other types of courses as well. First, most of these courses are either required or are program electives within the technical business program major offered by the three academic campuses of the college district. However, many of the courses offered within this major have chronic low enrollments on each of the three campuses. This produces a situation where the courses are usually canceled, yet they are still required by the students for graduation. Since there are currently no viable substitutes for the required courses the students who lack these courses usually have to settle for some unrelated course substitution simply to meet graduation requirements. Through the utilization of the interactive network, courses can be offered to students at all three campuses and therefore the courses have a greater probability of maintaining sufficient enrollment for the class to be offered. Also, these courses can be offered more frequently with success when drawing from multiple location. While one campus may not be able to offer a course frequently on-site, the "network" may offer that same course at least two times each year instead of once every two years.

This process of offering low enrollment courses to multiple sites also produces a more economically feasible situation for the college. Embry-Riddle Aeronautical University would also have a

potential economic benefit. We are aware that often course offerings are limited to the instructors available at a given term. Also, class enrollment may be so small as to make it economically impossible to offer the class. By allowing students to enroll for a course offered at another location, the cost of the instruction would decrease - only one instructor would need to be contracted and more students would be enrolled allowing classes to be taught more frequently with good enrollments.

Another advantage is that students are offered a variety of instructional styles through the interactive distance education network. Offering courses on the interactive network provides an opportunity for students to receive instruction from a variety of instructors with different professional perspectives and interests. By interacting with instructors from other campuses/centers, the students are exposed to different ideas and techniques which they might not have encountered at their own campus/center. Different instructors have different perspectives and opinions on the same topic. Variety in exposure to these diverse perspectives and ideas opens the students to more opportunity to develop their own perspectives and opinions on a variety of topics. Students also observe the different points of view and learn to problem-solve from different perspectives. Even the interaction among students from the different sites can provide new and expanded educational possibilities for not only the origination site students but also the faculty.

The interactive component of the distance education network can offer learning opportunities for the students other than those provided by the instructor. One approach for using this technique is the integration of guest speakers. Through these individuals the students can be provided with pertinent information that is currently being utilized by business and industry in that particular field. This technique was used extensively in the Entrepreneurial Problem Solving course and also in the Income Tax course. The interactive network allowed the speakers to provide pertinent information to the students at all of the sites at the same time. Students have the opportunity to interact with professionals they might not (probably not) ever be able to question. Speakers can be attracted from a variety of backgrounds and locations. There have been occasions when certain guest speakers would not have been available if limited to one and only one location for presentation. These opportunities have elicited a lot of information that the faculty may not have had the specific expertise to explore or may not have thought to explore. On several occasions the guest speakers were actually located at remote sites from the classroom instructor, sometimes originating at a site with no students in the classroom with the guest. Remote origination for guest speakers, lectures, and other professionals in the field opens tremendous learning possibilities for the students and provides viable alternatives to the classroom lecture.

A major advantage associated with

interactive distance education for the technical business students is the exposure to new and advanced communications technology. In the "real world" or work, being adaptable and receptive to new and emerging technologies is a primary asset for the student in the quest for professional success and advancement. Students should experience these technologies as much as possible in the classroom to fully understand how they can be integrated into various business operations. The simple classroom lecture can no longer provide all that is needed to ensure the success of the students once they have completed their degree program and began work. More and more, technological knowledge and problem-solving ability will be "the" marketable attributes of college graduates.

DISADVANTAGES AND PROBLEMS

"While distance education can solve many academic problems, it typically creates more than a few in the process" (Willis, 1993, p.3). As with all innovative endeavors, there are certain inherent disadvantages and problems which must be identified and solved to ensure the effective operation of the interactive network. This is especially true when working with technologically advanced systems such as those utilized for interactive distance education. Therefore, it should not be a surprise that the first disadvantage relates to network down-time. Any electronically supported network will face the usual array of possible problems such as those associated with communication lines, electrical power interruption, and malfunctioning equipment. Although most of these situations are beyond

the immediate control of the distance education administrator, efforts must be continually made to eliminate all manageable network problems. Recently, we have seen a tremendous improvement in the system. We lose fewer and fewer class hours due to system problems than when the system began operation in 1994. However, procedures must be established for the faculty and students relative to problem situations which cannot be immediately solved with the available personnel or resources.

Another disadvantage concerns the instructional materials utilized by the vocational/technical faculty for their interactive classes. In many instances, the instructional materials which the faculty incorporate into their "regular" or traditional classes will not translate completely to the interactive environment. Faculty training is a must to acquaint them with the limitations of the system in presenting/preparing instructional materials. If the faculty do not receive appropriate training on the design and utilization of instructional materials for the interactive network, then an extensive amount of time will be lost during the term trying to catch-up in this important area. Faculty training should be based on the type of hardware that makes up the interactive technology of the network. Since not all systems have the same hardware configurations, training must be customized to meet the needs of the faculty based on the technology found within their institution.

One disadvantage reported by faculty concerns the administrative component of the

interactive course as they relate to the origination and remote sites. Such aspects as class scheduling including campus location and time, faculty office hours for remote site students, counseling, transporting class materials and tests, will all have a varying degree of impact on the instructional effectiveness and efficiency of both the course and the instructor. Adequate time for faculty planning of such administrative tasks is essential to prevent the need for "crisis management" of the interactive class during the term. Faculty must plan far in advance in order to design and have materials at the remote site locations when needed.

Sometimes a FAX is sufficient to get materials to the remote site locations in a timely fashion.

However, that is not the case 100% of the time. Advance planning is a MUST!!!

INSTRUCTIONAL EXPERIENCE

For many vocational/technical faculty the thought of offering a course via live television within an interactive distance education environment is a frightening concept. This can be especially true for some technical business courses which have been traditionally taught utilizing the lecture technique and the chalkboard. Alterations in the instructional techniques and styles were the greatest challenges incurred by the technical business faculty teaching these interactive courses. Changes included such components as presentation, instructional materials, student interaction, technology (equipment) awareness, and even personal appearance.

Although the lecture, with interactive

components added, is still the major instructional technique even with the network classes, the chalkboard as the support component has basically been replaced with the documents camera which is part of most interactive video networks. Faculty must remember, the documents camera is NOT a chalkboard! As an example, faculty who usually use the chalkboard for working cost accounting problems must now alter that approach and materials to fit the requirements of the documents camera. The same process is also true for working formulas associated with the Business Finance course and completing tax forms for the Income Tax course. Traditional materials from the publishers do not usually translate well when depending upon the documents camera. Faculty must remember that they are, in effect, preparing a television show. The materials used on the documents camera will be seen on a TV screen not only at the remote site location, but also in the originating classroom.

ALL students must be able to read any material presented on the screen. Some faculty have found that for working problems such as in cost accounting, finance, and tax that white paper and a medium-tip marking pen works well. The white paper substitutes for the chalkboard and the marking pen for the chalk. This enables all students at all locations access to the same materials and instruction.

Questions concerning fair use in the application of the federal copyright law and the broadcasting of certain instructional materials on an interactive distance education network must also be answered based on the

most current available information. There are still many questions remaining in the “fuzzy” area of educational fair use of copyright protected materials and also how the law applies to an interactive distance education network.

Another consideration of the instructional approach used by the faculty relates to the process of facilitating interaction between and among the students at all sites. Learning within any setting is an active activity itself, however, effective student interaction is an essential component of any interactive distance education course. Simple things such as knowing the names and asking questions of individual students at all sites will facilitate interaction. The faculty member should also look at the camera broadcasting the video signal to the remote sites approximately once every twelve seconds to give the impression that they are looking directly at the remote site students. There is also a tendency for faculty to look at the front remote site monitor when talking with the remote site students. This gives the impression of the faculty member talking to the side of the monitor instead of directly to the remote site students. This situation can be avoided if the faculty member will remember to look and speak directly into the instructor camera. Interactive distance education requires a constant attempt by the faculty to ensure the involvement of all students at all sites with the course, materials, and instruction.

Modifications to the individual teaching style of the faculty can also be the

result of the various equipment components which make up the technology for the network. The most obvious change for the faculty is the restricted movement caused by the instructor's microphone cable. Faculty that walk or move about the classroom extensively during their normal teaching style sometimes find it difficult to adjust to the interactive distance education environment. Although a wireless microphone can be used, by restricting the movement of the faculty with the microphone cable, it is easier to keep the faculty in frame so that the picture received at the remote site is not distracting to those students. This is a very important consideration since all the remote site students have for instruction is the television picture on the monitor received from the origination site. Faculty must remember they are "putting on a show" and must stay within the confines of the camera.

IMPACT ON LEARNING

The impact on learning for the interactive network classes was generally positive based on the grades, attendance, and participation by the students in the different technical courses. Most of the students asked at the end of each semester when the college was going to offer more of the classes on the network since many of the technical business courses were in a low enrollment area for each campus. The classes offered have been very well received. Some faculty believe that interactive classes have higher grades than the traditional classroom setting, possibly for the following reasons: (1) interaction between the instructor and the students and among the

students themselves is usually high, and (2) the opportunity and availability of guest speakers. Both of these factors appear to keep attendance and interest high. Boredom is usually not a problem in the interactive classroom. Students exhibited an eagerness to be involved with network classes and were recommending these classes to other students.

These student recommendations are viewed as an indication of a very positive educational experience developed and presented in an innovative setting. Interaction between the students at all site locations is also a factor. The students appear to really like to share information and experiences with each other and to find out what goes on at the other campuses/centers. This contributes to a positive learning experience.

RESEARCH

The amount of research available relative to the many components that make up an interactive distance education network is not extensive. This task will also be made somewhat difficult because of the nature of the instructional environment, the relatively recent development of interactive distance education, and the ever changing aspect of the technology. The following analysis will look at several areas that impact the overall effectiveness of interactive distance education including faculty training, administrative considerations, and student attitudes.

The success of any interactive distance education program will require extensive training for the faculty before classes are offered on the network (Carter, 1995). Instructional planning is a very important part

of this training process. This concept is supported by Price and Repman (1995, p.251) when they state that "The effectiveness of courses delivered over a distance, like face-to-face instruction, depends on the planning of the course, class activities and the instructional materials used." The need for appropriate faculty training in all aspects of the interactive classroom is imperative to ensure that the instructional planning and presentation process will meet the needs of both the faculty and the students to be served.

Administrative considerations within the training process for the faculty would include such components as instructional support materials, lead time for getting materials to different sites, hardware/software availability, local library facilities and holdings, classwork/homework, and test. Although these items may seem insignificant in relation to other instructional problems, each of these components will require extensive planning by the faculty to ensure the effective operation of the interactive course. It should also be noted that adequate preparation time must also be provided to the faculty in the planning and development of appropriate instructional materials for the interactive course. The instructional materials utilized for traditional classes do not always "fit" the technology of the interactive classroom. Without adequate planning for all of the administrative components, serious problems can arise for the faculty when dealing with the educational needs of the technical students, especially those at the remote sites (Carter, 1995).

One area of research that is of a

concern for the faculty relates to the attitudes of students who have taken courses through interactive distance education (Jurasek, 1993; Schlosser and Anderson, 1994). Results from this research can assist faculty in the planning of an interactive class in order to avoid potential problems identified with other distance education endeavors. Interaction between the faculty and the students at all sites, but particularly at the remote sites, is one aspect that has proven to be an essential component to the success of any interactive class (Rezabek, Cochenour, Bruce, and Shade, 1995; Lott and Carter, 1995). The goal of interactive distance education is "to make the experience of the remote student comparable to the experience of the local learner" (Simonson and Schlosser, 1995, p. 13). The quality and academic integrity of interactive distance education will suffer if the educational experiences provided are not the same for all students at all sites on the network

REFERENCES

- Carter, A. (1995). Developing Faculty Training for Interactive Distance Education. *Innovations in Education and Training International*, 32(2), 147-152.
- Jurasek, K. (1993). *Distance Education via Compressed Video: An Evaluation of the Attitudes and Perceptions of Students and Instructors*. Unpublished master's thesis, Iowa State University, Ames, Iowa.
- Lott, W. And Carter, A. (1995). *Analyzing Community College Student Attitudes Relating to Interactive Distance Education*. Presented at the annual Conference of the Mid-South Educational Research Association, Biloxi, Mississippi.
- Price, R. And Repman, J. (1995). Instructional Design for College-Level Courses Using Interactive Television. *Journal of Educational Technology Systems*, 23(3), 251-263.
- Rezabek, L., Cochenour, J., Bruce, M. And Shade, R. (1995). Effective Use of Compressed Video for Teaching and Learning. In Hakes, B., Cochenour, J., Rezabek, L., and Sachs, S. (eds) *Compressed Video for Instruction: Operations and Applications*, Washington, DC: Association for Educational Communications and Technology.
- Schlosser, C. And Anderson, M. (1994). *Distance Education: Review of the Literature*, Washington, DC: Association for Educational Communications and technology.
- Simonson, M. And Schlosser, D. (1995). More Than Fiber: Distance Education in Iowa. *Tech Trends*, 40(5), 13-15.
- Willis, B. (1993). *Distance Education A Practical Guide*, Englewood Cliffs, NJ: Educational Technology Publications.

*A Systematic Methodology for:
Keeping the Teacher in the Learning Process
While Utilizing New Technology Tools*

**A Systematic Methodology for:
KEEPING THE TEACHER IN THE LEARNING PROCESS
WHILE UTILIZING NEW TECHNOLOGY TOOLS**

**Melvin J Anderson, Ph.D.
Adjunct Professor
Embry-Riddle Aeronautical University
College of Career Education, Colorado Springs, Colorado**

ABSTRACT

**A Systematic Methodology for:
KEEPING THE TEACHER IN THE LEARNING PROCESS WHILE
USING THE NEW TECHNOLOGY TOOLS**

Melvin J Anderson, Ph.D.

May, 1998

This paper describes a systematic process for implementing effective use of new technology tools in the modern college classroom. It provides a workable method for insuring that specific necessary conditions have been met for each teacher and each classroom--not a "silver bullet" that will work everywhere for everyone, but a case-by-case way of assessing and implementing.

The paper begins by recognizing the changing educational environment and the emergence of the "cyberschools"--the electronic classrooms that distribute training via video tapes, the internet and cable television. Although these media are becoming more prolific, they do not provide the interactive learning environment of the formal college classroom. Traditional academe has already updated most classrooms with video tape recorders and overhead projectors, but these do not constitute "new technology tools" such as state-of-the-art high-definition video projectors, computers, interactive computer simulation software and distance learning tools that link classrooms. Many students now use personal computers to access oceans of data via the World-Wide Web--"new tools" from the student's perspective, but teachers do not always insure that students use them effectively. The problem is not the capability of these new tools, but in the teacher's inability or reticence to use them effectively, or worse: allowing the tools to push the teacher out of the learning process and the student to substitute "search" for research.

The author maintains that each teacher-classroom situation presents a unique case. The new technology tools alone do not make a college teacher a mentor, nor do they make lectures into interactive learning experiences. The challenge lies in using the new tools effectively to enhance teaching skills, not to replace teachers. There is a middle ground in which the effective teacher uses the tools to teach students how to think and how to ask the right questions--to prepare them for life in a future in which the current answers will not work and in which new answers do not yet exist. This is the real goal of higher education; this is the basic advantage traditional classroom teaching has over its electronic competitors.

*A Systematic Methodology for:
Keeping the Teacher in the Learning Process
While Utilizing New Technology Tools*

A simple but fully-articulated logical process of improvement is presented that permits a case-by-case diagnosis of each teacher/classroom situation to ascertain actions required to overcome specific obstacles to the effective use of the new tools. The paper shows how to match each obstacle with an appropriate action that will overcome it, resulting in a workable checklist for insuring that each of the three basic necessary conditions for effective use of the tools is met.

The paper concludes with a method for overcoming the layers of resistance to implementing the tools by exposing typical flawed assumptions. It does not offer universal solutions or answers, but rather a method for asking the right questions to overcome the obstacles that prevent effective use of the new technology tools and keep the teacher in the learning process while using them.

A Systematic Methodology for:

**KEEPING THE TEACHER IN THE LEARNING PROCESS WHILE
USING THE NEW TECHNOLOGY TOOLS**

Melvin J Anderson, Ph.D.

INTRODUCTION

Education in the 1990s has seen a dramatic increase in the number of nontraditional education and training programs. The "electronic classroom" is available to any student who has a computer with modem, a cable television connection or video cassette recorder. To the chagrin of many traditional academists, "cyberschools" have become a competitive force that must be reckoned with--one way or another. While some colleges and their faculties have chosen to ignore these external threats, others have claimed to "join them" by adding audiovisual capabilities (overhead projectors and video recorders) to the classroom environment. Unfortunately, joining them or emulating the competition has not given higher education a new competitive advantage in the changing academic environment.

New Technology, but . . .

A number of schools have recently introduced truly new technology tools to their classrooms. When properly used, this new technology can make a good teacher a great teacher, a good course a dynamic learning experience, and make an interactive real-time lecture available to students in

distance locations. Many colleges have successfully extended their reach and enhanced their curricula with distance learning tools, effective new classroom technology tools and innovative interactive simulation software. Unfortunately, some of their faculty have had less-than-satisfactory experiences in integrating these new tools into the existing academic formats and courses. There is something to learn from the positive experiences, but the negative outcomes present a complicated set of circumstances that are related to the teachers' abilities and willingness to use the tools, as well as to the tools themselves.

The situation is complicated by the fact that each teacher's experience with the new tools is unique. There can be no one "silver bullet" solution that will bring each teacher to an ideal level of success using these tools.

The Problem Goes Both Ways

While some teachers have underutilized the tools, other teachers have allowed the tools to "take over"--to push the teacher into the background and come between hem and the students. Neither of these outcomes is desirable. Both of them can be corrected.

The situation is complex. Unfortunately, complex solutions only add more complexity. What is still needed is a simple (not simplistic), solution based on the real causes for the undesirable outcomes. Simply citing the undesirable effects of a deeper core problem does nothing to resolve things. In fact, "attacking the effects" is a poor substitute for defining the real problem and constructing a system-wide solution--one that can determine what must be done to bring *each teacher* (not the same as "*all teachers*") to the desired outcome--effective use of the tools--*and keep them there*.

This paper is about finding and overcoming the obstacles to effective utilization of these new technology tools in the classroom. The key to removing these obstacles lies in *identifying the flawed assumptions that underlie resistance to change*. The longer it takes to do this, the more urgent and more difficult the problem will be.

The Problem is Still Growing--Internally

American higher education faces new issues regularly. Tenure, sexual harassment, campus politics and affirmative action created brief furries and then began to respond to sensible solutions. Other issues, like textbook obsolescence and grade inflation remain to be resolved, but one academic issue that is still growing and exposing new problems for schools, faculty

and students--all at the same time--is the use of new technology tools to improve teaching skills.

The question is not whether we will have these tools. The question is whether we can bring the tools into successful use in the college classroom *while keeping the teacher in the learning process*. A lot of planning and expense have already been directed toward new classroom tools like video projectors, sophisticated presentation software and computers with distance learning systems that link up several classrooms in real time. But despite considerable effort to make these new tools really work to enhance teaching skills and make the teacher more a part of the learning process, there is evidence that the tools are frequently not being used effectively to these ends.

Most classrooms already have overhead slide projectors and video tape recorders. Many teachers and schools have developed extensive libraries of impressive materials to use in these media. They've mastered these earlier tools and materials and they're very happy with them; they work as expected. They do not replace the teacher; they do not intimidate him. But the new technology tools are different. They're more sophisticated; they require training, new course materials and application software. The presence of these new tools in the classroom does not automatically create a successful educational experience.

Meeting the Challenge

No systematic approach to this issue has been developed. The undesirable outcomes are evident, but differences of viewpoint abound. What is still needed is a systematic analysis of the entire issue to uncover the real core problems therein, and a logically-developed action plan that will overcome every real obstacle to effective use of these tools. Blanket approaches have little hope of success because for each case of ineffective use of the tools, there is a unique and different cause. Every teacher and classroom is a different case. Moreover, ineffective use of the tools can be caused by overuse as well as underuse. To achieve effective use of these tools, it is important to consider both ends of the issue--a teacher's hesitancy in using the tools as well as Hess potential "submission" to them at the expense of interactive learning. Anything that comes between the teacher and the student inevitably detracts from the learning process.

The tools alone are not the answer. The answer lies in *keeping the teacher in the learning process* while utilizing them.

Using the Tools Incorrectly

With faculty encouragement, many students have found that researching their coursework on "the web" is much easier than spending hours in cold, inhospitable, music-free libraries with musty old books and methodical old librarians. While many

libraries have enhanced their internal resources with computer filing systems and online research to other libraries, students now see them not as repositories of words and ideas but as centers for retrieval of information--or just data.

A number of educators report a sudden decline in the quality of student research and originality of thought in term papers because of ineffective use of new technology tools. David Rothenberg, in an August 15, 1997 article in *The Chronicle of Higher Education* (Point of View, page A44) entitled "How the Web Destroys the Quality of Students' Research Papers," describes "... the latest easy way of writing a paper: doing their research on the World-Wide Web." Such work, says Rothenberg, usually cites no books, just articles and references beginning with <http://www>, etc. Quotes and comments, beautiful pictures and graphs, often poorly related to the topic of the paper, masquerade for original work. A student confronted with thousands of supposed references to a single topic can only hunt and peck for one to use. Since these references are not arranged in order of importance, the student picks a suitably-titled or adequately-sized piece to fit. Instead of books that one must read carefully and understand, the student cites quips, blips, pictures, short summaries and fragmented summaries of summaries--all in perfect style thanks to a word processor that corrects spelling and can even "fill" white space by increasing font size and widening margins. The audiovisual versions of this type of paper--overhead

*A Systematic Methodology for:
Keeping the Teacher in the Learning Process
While Utilizing New Technology Tools*

slides and Power Point presentations--are equally attractive, simple to create--and unable to sustain a learned argument. According to Rothenberg, college libraries with limited budgets must divert funds from books to computer technology that will itself become obsolete in a few years. The message to students is clear: "Don't read, just connect. Surf. Download. Cut and Paste. Ignore credibility, logic, judgement, passion. Disregard differences of opinion. Any exploration tool is a good one if it gets you some random hits. Arguments do not progress beyond the appearance on the screen of a suitable reference. Your attention span only needs to be long enough to wait for the modem to connect to another site." There are even World-Wide Web sites named "Cheating."

When a university merely joins "them" (the electronic classrooms) by adding technology, the students may learn current right answers to questions; but in time all the answers will change. What they will not learn is *how to ask the right questions*. And that's what formal higher education provides that no other type of training or education can deliver.

Defining the Problem

The problem is that we are not using the new technology tools in academe effectively. The mere possession of these devices doesn't make them useful. In fact, allowing them to become commonplace items for faculty and

student use without determining their proper role in the learning process can result in poor learning outcomes masked by glittery lecture materials, smooth student presentations and impressive-looking term papers. While some students are retreating from legitimate research by using the World-Wide Web, some teachers are retreating from interactive classroom discussions by using showy projector slides and video tapes.

Most college deans and department chairpersons know the difference between substance and show, between logic and randomness, between "search" and research, and between original thought and chunks of data that appear on a screen.

If deans and other academic leaders know these non-subtle differences, then why do the problems associated with implementing technology tools persist?

A Process of Ongoing Improvement

Nothing really happens by chance; all undesirable outcomes have causes, and immediate causes are merely effects of more basic causes. If we recognize the undesirable academic effects cited above--unrealized improvement in learning despite new technology tools--and we know that better outcomes are surely intended and sorely needed, then the question must focus on the points in the system that most constrain the successful use of the new technology. Focusing on everything is focusing on

*A Systematic Methodology for:
Keeping the Teacher in the Learning Process
While Utilizing New Technology Tools*

nothing; improvement requires first asking: *what to change?* We must identify the few real core problems that constrain system performance. In a chain, it's the weakest link. In a factory, it's the slowest machine. In an organization, it's usually the absence of one or more necessary conditions for achievement of a specific objective. With logical analysis, it is possible to systematically trace undesirable outcomes to specific core problems that are clearly *what to change*--what critically few things that when changed will lead to the most improvement.

Then, if we know what to change, we can ask the two remaining questions: *To what to change?* and finally, *How to cause the indicated change?* All change necessarily involves these three questions.

Answering these three questions of change outlines a step-by-step process of ongoing improvement that will address the needs of each school and each teacher more effectively than broad-brush, one-size-fits-all approaches that get a few "hits" but still leave many teachers not using the new technology tools effectively.

WHAT TO CHANGE?

We acknowledge the obvious value of technology in the classroom and we can justify the expense incurred in acquiring the new technology tools of teaching and learning. These tools usually arrive at the

schools capable and ready to improve the learning process. If we also acknowledge that the intended educational outcomes therefrom are not materializing satisfactorily, then we must conclude that something *internal* prevents the effective use of these tools in achieving the desired result. We cannot blame the World-Wide Web, IBM or Microsoft for providing students with remarkable new avenues of information and versatile computer hardware and software that can find it, paste it and print it. Nor can we blame God for that aspect of human nature that causes students to want to get better grades with less actual work, or for teachers' resistance to change. Every undesirable outcomes has a *root cause* that is an internal policy of the institution--something that is *within the span of control* of the persons who make policy in the institution or in the classroom--especially in the classroom.

Classroom technology and the decision to use it is not the core problem. Neither is the students' access to the "electronic superhighway;" these external tools are no more to blame than the internal ones. The teacher can either lead people to knowledge by teaching them how to think and ask the right questions, or simply allow the classroom to become a reporting point for what students find in the placelessness of the Web. The teacher can interact with the students and cause them to think, or simply show them the current answers to questions. It's up to the professor to demand legitimate research in the real world and to demand

legitimate, researched discussion in the classroom. Then and only then will students address real problems, test theories and concepts proposed in the classroom, and bring into the classroom knowledge about what works and what doesn't work. With a teacher capable and willing to use the new technology tools, valid research and interactive discussion can turn a lecture into an even more dynamic learning experience. Moreover, these tools permit the use of the latest and best learning devices ever developed: interactive computer simulations.

Means, Method and Motive

Almost every teacher knows how to begin using classroom tools--at least how to plug them in, turn them on and make them light up. But it takes more. As we introduce new tools into the classroom, we must insure that the *three necessary conditions* for their successful academic use have been met. These three necessary conditions are the basic universal requirements for any action to be possible. Simply stated, they are *means, method and motive*.

The *means* to the use of technology in the classroom consists of the actual resources--state-of-the-art technology tools that are capable of bringing new knowledge into the classroom, presenting this knowledge effectively, and extending the classroom to persons at other sites electronically. Attractive overhead slides and entertaining video tapes have a tendency to detract from the content of lectures or reports; they can

falsely impress the students and they can cause the teacher to spend more time on their appearance than on their content. Today's new technology tools are much more; they are hardware and software items that can extend both the student's ability to learn and the teacher's ability to teach; they enhance the lectures and enable students to do legitimate research--if the teacher knows how to use them.

The *method* of using technology in the classroom is equally important. The teacher must know how to use the tools to lead students in the search for knowledge. There is no shortage of data, but data must be sifted and classified to be useful information.

A computer can sort data, but extracting knowledge from information requires a human intellect--someone who can determine relevance to specific needs and objectives. The teacher must levy clear performance requirements on students that result in legitimate research and reports that answer specific questions. S/he must transmit expectations to students that reflect the testing of ideas, synthesizing disparate sources and arriving at defensible conclusions. With this mandate clearly explained, the student is more likely to use the most appropriate sources for the synthesis of knowledge. If the student knows how to use these sources for relevant information, and if the teacher demands that the student produce conclusions based on asking the right questions of these sources, then two positive things occur: First, the student actually learns how to ask the right

*A Systematic Methodology for:
Keeping the Teacher in the Learning Process
While Utilizing New Technology Tools*

questions to gain knowledge in his future educational and professional efforts. Second, the student begins to learn how to think--not just how to find and report, but to think. But this requires a teacher who wants to make this happen.

The *motive* required for successful use of technology in the classroom is more difficult to define and create. The teacher must himself possess sufficient motivation to want to adapt his courses to the proper use of technology tools. Getting teachers to learn to use these tools effectively isn't the biggest challenge. Getting teachers to *want to use* them and to want to require that students create and present learned work with them is the real challenge. Remember, the objective is the effective use of the new technology tools--neither ignoring them nor allowing them to push the teacher into the back of the room.

If we accurately answer the first question, *what to change?* then we know what necessary conditions are unmet for effective use of the tools for each case. We can proceed to the second question, which addresses the answer to the first question.

TO WHAT TO CHANGE?

Answering the first question, *what to change?* identifies the absence in each case of adequate means, method or motive (any or all of them) necessary for effective use of the new tools.

The second question is also important. If

we're going to change something, we also must know *what to change it to*. This seems almost too basic to need restatement, but unless these questions are answered in the correct order, we get wrong results--we get "ready, fire, aim."

The desired outcome (objective) of our change activity is clear: "The teacher possesses the means, method and motive necessary to use the new technology tools effectively." For this objective to be assured, three necessary conditions must be met for each classroom and teacher.

Necessary Condition 1:

The new technology tools are available and useable in the classroom (*means*).

Necessary Condition 2:

The teacher knows how to use the tools effectively (*method*).

Necessary Condition 3:

The teacher wants to use the tools effectively (*motive*).

Unless all of these three conditions are met, the objective will not be achieved. It's like a three-legged stool; remove one leg and it cannot stand. *To what to change* is clearly the assured satisfaction of these three conditions in each teacher/classroom situation. But a third question must also be answered--with action that causes the needed change: *how to cause the indicated change?*

HOW TO CAUSE THE CHANGE

Causal relationships involve step-by-step logical connections, without missing even one step. It's somewhat like dominoes being set in a row so that when the first one is pushed over, all the rest fall in order. If one domino is missing, the action stops. If one step in an analysis is omitted, the logic stops.

In every organization, a series of causal relationships exists. If we miss one "domino" in the analysis of a problem, we fail to identify its root causes. If we miss one "domino" in constructing and communicating a solution, then our efforts toward change have no effect on the final outcome. All three "legs" (conditions) must be met and all three must be rooted in actions that cause them to exist--truly exist. But causing the needed changes to meet these conditions does not occur without identifying and overcoming the specific obstacles that prevent implementation--on a case-by-case basis.

Overcoming the Obstacles

As previously stated, the three necessary conditions for a teacher to use the new technology tools effectively are:

- (1) The tools are available and useable in the classroom.
 - (2) The teacher knows how to use them effectively.
 - (3) The teacher wants to use them effectively.
- Causing each of these conditions to exist

requires actions to overcome specific obstacles. Unless the obstacles (current and potential) are known, the requisite actions cannot be determined. For each classroom and each teacher, the current and potential obstacles to actual implementation of the tools must be known.

A Checklist for Identifying Obstacles and Overcoming Them

As we examine each of these obstacles, we can probably think of at least one way to overcome it. We can then choose the best way to overcome each obstacle, one by one, and arrive at the best required action to overcome it. Then we can arrange the pairs by sequence/dependency until all the obstacles are included with their respective actions, in an order that describes the logical sequence leading from one to the next. The resultant list gives us a checklist containing the order in which we must perform the required actions:

Necessary condition 1: The new technology tools are available and useable in the classroom.

Potential Obstacles:

- a. The tools have not been delivered and installed in the classroom.
- b. The tools lack necessary additional software, equipment, hookups and supplies.

*A Systematic Methodology for:
Keeping the Teacher in the Learning Process
While Utilizing New Technology Tools*

- c. Funds are not available to purchase the types of tool required.
- d. The proper types of tool have not been determined or approved.

Placing the obstacles and required actions to overcome them in a logical sequence, we get:

Obstacle d: The proper types of tool have not been determined or approved.

Action required: Conduct appropriate analysis to determine tool requirements.

Obstacle c: Funds are not available to purchase the types of tool required.

Action required: Allocate necessary funds for purchase of the tools.

Obstacle a: The tools have not been delivered and installed in the classroom.

Action required: Deliver and install the tools.

Obstacle b: The tools lack necessary additional software, equipment, hookups & supplies.

Action required: Acquire and install additional equipment and obtain software & supplies.

When completed, we will know exactly what actions must be taken to overcome all the known obstacles to meeting each requirement, and in what order, as

appropriate for each case:

1. Conduct appropriate analysis to determine tool requirements.
2. Earmark necessary funds for purchase of the tools.
3. Deliver and install the tools.
4. Acquire and install additional support equipment and obtain software and supplies.

When these actions are completed, the tools will be available and useable in the classroom. The same analysis can be used for the other two necessary conditions.

Necessary condition 2: The teacher knows how to use the tools effectively.

Potential Obstacles:

- e. The teacher hasn't attended adequate training on the effective use of the tools.
- f. The teacher is unaware of timely and convenient training opportunities.
- g. The teacher doesn't know that thorough training is necessary.
- h. The teacher isn't aware of the value of the tools in meeting his teaching goals.

Next, pair each obstacle with the action that will overcome it, and arrange the pairs by

*A Systematic Methodology for:
Keeping the Teacher in the Learning Process
While Utilizing New Technology Tools*

sequence/dependency, in the sequence appropriate for each case:

Obstacle h: The teacher isn't aware of the value of the tools in meeting his teaching goals.

Action required: Educate teacher about the value of the tools in meeting teaching goals.

Obstacle g: The teacher doesn't know that thorough training is necessary.

Action required: Insure that teacher realizes training is necessary for effective use of tools.

Obstacle f: The teacher is unaware of timely and convenient training opportunities.

Action required: Schedule convenient training and provide the teacher with the schedule.

Obstacle e: The teacher hasn't attended adequate training on the effective use of the tools.

Action required: Provide the teacher with thorough and convincing training.

Again, schedule the actions determined above, as needed:

1. Educate the teacher about the value of the tools in meeting his teaching goals.
2. Insure that the teacher realizes that training is necessary for effective use of the tools.
3. Schedule of convenient training

and provide the teacher with the schedule.

4. Provide the teacher with thorough and convincing training.

Necessary condition 3: The teacher wants to use the tools effectively.

Potential obstacles:

- i. The teacher is not aware of the importance of new technology tools in academe.
- j. The teacher does not believe that his lectures will be enhanced by the tools.
- k. The teacher does not believe that students' learning will benefit by the tools.
- l. The teacher believes s/he can agree about the tools and then ignore them.
- m. The teacher does not believe s/he can personally master the use of the tools.

Paring each obstacle with a proper action to overcome it, we get:

Obstacle i: Teacher is not aware of the importance of new technology tools in academe.

Action required: Establish a program to develop every teacher's belief in the importance of the tools and their impact on student learning, the future of the institution and his job.

Obstacle i: The teacher believes s/he can agree about the tools and then ignore them.

Action required: Show teacher a firm schedule for measuring performance with the tools.

Obstacle j: The teacher does not believe his lectures will be enhanced by the tools.

Action required: Get teacher to attend lectures of teachers who use the tools effectively.

Obstacle k: The teacher does not believe the students' learning will benefit from the tools.

Action required: Show teacher difference between students' work with/without the tools.

Obstacle m: The teacher does not believe s/he can personally master the use of the tools.

Action required: Do not conclude training until teacher demonstrates mastery to himself.

Now schedule the actions determined above, as needed:

1. Establish a program to develop every teacher's belief in the importance of the tools and their impact on student learning, the future of the institution and his job.

2. Show the teacher a firm schedule for measuring performance with the tools.

3. Get the teacher to attend lectures

of other teachers who use the tools effectively.

4. Show the teacher the difference between students' work with and without the tools.

5. Do not conclude training until the teacher demonstrates mastery to himself.

How to cause the change is a systematic process of overcoming obstacles to meeting specific objectives by determining and carrying out specific actions--in the proper order. This process can become an ongoing improvement process; as new teachers join an institution's faculty, the same potential obstacles may exist and require appropriate actions. But we aren't done yet.

LAYERS OF RESISTANCE

Who could possibly resist this approach? Everyone! We may convince ourselves that these actions are necessary in terms of the problem as we perceive it, and that their completion will solve it. But we know intuitively that not every educator and administrator will agree on what the problem is, how to solve it, and if our solution will actually work throughout the system. Whenever there is disagreement about how to achieve an objective, we can usually find hidden conflict. But is the perception of conflict accurate?

The hard sciences maintain that there is no conflict in reality, only perceptions of conflict based on *flawed assumptions*; that people

usually fear, like loss of authority, security, comfort and control. Therefore, to break a perceived conflict, we must systematically expose the underlying flawed assumptions and address them to the satisfaction of the persons affected by the change.

Overcoming Resistance

Besides identifying the core problems and generating systematic, domino-like solutions, causing change also requires overcoming the layers of resistance generated by flawed assumptions.

There are five potential layers of resistance that must be "peeled away," one at a time--in the following order:

1. "The problem you cite is not a real problem."
2. "The solution you offer won't fix the problem."
3. "We have no control over the resources needed."
4. "Your solution will cause more problems than it fixes."
5. "You and I may be able and willing to do it, but will *they* do it?"

On the surface, these assertions seem plausible. However, if we state each assumption in its most extreme level (use words like "*all*," "*no way*," "*only*," etc.), it becomes obvious that it may be a generalization that can be resolved by providing a proper response. For example:

1. "The problem you cite is not a real problem. Academe is in *no way* threatened by the electronic classroom; student work *cannot* be improved. The slides and videos we use now provide *all* that we need. Student use of the World-Wide Web for research produces the *best* work possible. *No one* will benefit from being able to access lectures electronically. Our present methods can *never* be improved upon."

Response: There is ample evidence that a real problem exists. This is the necessary first step in getting buy-in from resisters, but there is more persuasion needed. Much more; after the resister realizes what the real problem is, s/he is very likely to resist the solution. Read on.

2. "The solution you offer will *never* fix the problem. New technology tools *never* work. The technology isn't good enough yet. Teachers *cannot* learn new teaching methods. *No* teachers will go along with the use of new technology tools."

Response: Good examples of the tools working already exist; the necessary conditions for effective use of the tools can be shown to work elsewhere, and they make sense when examined.

3. "We have no control over the resources needed. We *cannot* afford the necessary tools. We cannot require teachers to attend training. The teachers will *never* go along.

*A Systematic Methodology for:
Keeping the Teacher in the Learning Process
While Utilizing New Technology Tools*

They will *never* throw away their old lecture materials.”

Response: The flawed assumptions above can be exposed by showing resisters the logical step-by-step process of overcoming the objections in “how to cause the change” in this paper. If the resister comes up with additional potential obstacles, they can be inserted into the solution with appropriate intermediate objectives to overcome them.

4. “Your solution will cause more problems than it fixes. Asking the teachers to learn new techniques will *always* cause more going than growing. The technology tools will cost *too much*. The training program for teachers will take so much time, they’ll *never* be able to lecture. Our lecture methods will actually be degraded by changing them.”

Response: It’s unavoidable that some of the actions we take will create negative side effects. But these effects can be predicted beforehand, and avoided by adding additional actions into the solution. As each level of action is resolved, fewer and fewer negative effects will emerge in the analysis. Again, the resister can be shown how each potential obstacle can be overcome, one by one.

5. “You and I may be able and willing to do it, but will *they* do it? I *cannot* make commitments for other people. There’s *no* way to get everyone to go along. You may

convince a few of us, but *no one* else will try to make it work.”

Response: This is the one level of resistance that takes more than logic to overcome. Here is where the leadership skills of the change agents are revealed. More importantly, here is where the existing quality of leadership makes the biggest difference. At this layer of resistance, the answer may well be a question: *How well do you run your school now?* Solving this final layer of resistance will depend on your ability to persuade others to change, and that ability will depend on what kind of leadership already exists.

CONCLUSION

This paper shows that by examining the entire issue in terms of the objective (effective use of the new technology tools), analysis can reveal the core problems (unmet necessary conditions) that result in undesirable outcomes. But complex problems have many parts, just as complex organizations have many detailed issues and viewpoints. Only a systematic fully-articulated analysis can expose the relatively few root causes of each problem and point the way to a noncomplex, understandable solution. The paper also shows that by using a checklist for exposing and overcoming the obstacles in each teacher/classroom situation, an effective step-by-step plan for change is more easily determined. Finally, a method for “peeling away” the layers of resistance to

change is examined, to arrive at a systematic process of ongoing improvement.

No Simplistic Solutions or Answers

No simplistic solutions or answers are offered in this paper that will instantly resolve all the problems in implementing effective use of the new tools. What this paper presents is *a method for asking the right questions*--a logical process of finding what to change, to what to change, and how to cause the indicated change to resolve *each problem*. In many respects, this is what higher education is about--learning how to ask the right questions.

The preceding process has universal application. It is a systems management approach; it deals with the obstacles to goal achievement of the system, not just one part of it. New technology tools are not an end unto themselves; their effective use is not the goal of higher education; it is a means to that goal.

The Goal

The goal of higher education is *preparing people for life*. As with all products and services, the real measure of success rests with the customer; the user--the student. And since the student is very obviously attached to some of the new tools (the computer and the World-Wide Web, for

example), then the effective use of them in our classrooms is not only desirable, it is essential. It is *expected*. We had better make them work as they are capable of working--as tools that can make any teacher a more effective educator and every classroom a place of interactive learning. Otherwise, we will continue to see a breakdown in the teacher's ability to lead his students to understanding. Alison Schneider discusses this trend in his *Chronicle of Higher Education* article (March 27, 1998), "Insubordination and Intimidation Signal the End of Decorum in Many Classrooms."

The teacher who possesses the means, method and motive (ready, able and willing) to use these tools effectively will promptly invent operational rules for himself and his students that will make the tools work. The result will invariably be a classroom environment that inspires learning rather than simply reports findings, and generates participation by both teacher and student.

If we can systematically overcome the obstacles that prevent each teacher from using the new technology tools, then we will indeed keep them in the learning process while utilizing them.

BIBLIOGRAPHY
With Brief Descriptions

Books:

Dettmer, H. William. *Breaking the Constraints to World-Class Performance*. Milwaukee, Wisconsin: ASQ Quality Press, 1998. The author presents a systematic method for solving problems in organizations by identifying the obstacles to goal achievement.

Goldratt, Eliyahu M. and Jeff Cox. *The Goal: A Process of Ongoing Improvement* (Second Revised Edition), Great Barrington, Massachusetts: The North River Press, 1994. This three-million-copy bestseller provides a remarkably clear view of the use of constraints management to overcome the obstacles to goal achievement.

Goldratt, Eliyahu M. *Critical Chain*. Great Barrington, Massachusetts: The North River Press, 1997. A challenging view of higher education in the 1990s that describes many of the problems addressed in this paper.

Perelman, Lewis. *School's Out*. New York: William Morrow, 1992. This author offers some controversial opinions about the survivability of traditional institutions of higher learning in the new "electronic classroom" environment.

Articles and Papers:

Max Hitchens, "Taking Control with Software Modeling; Simulation, Emulation and Monitoring." *APICS Magazine*, December 1996. A powerful support for management simulation software as an effective learning tool.

Robert Lenzner and Stephen S. Johnson. "Seeing Things as They Really Are--College Education as we Know it is Threatened (Peter Drucker)." *Forbes Magazine*, March 10, 1997. Another strong warning that higher education faces formidable challenges to its very survival.

Nancy M. Levenburg, Ph.D., "Production/Operations Management Curricula: Thoughts from Practitioners and Professors." *E & R Foundation Research Paper Series*, 1996.

Michael Prowse, "Endangered Species. Modern electronic technology could mean that the days

*A Systematic Methodology for:
Keeping the Teacher in the Learning Process
While Utilizing New Technology Tools*

of academics at higher-education institutions are numbered.” *Financial Times*, November 20, 1995. A hard-hitting discussion about the changing academic environment.

David Rothenberg, “How the Web Destroys the Quality of Students’ Research Papers.” *The Chronicle of Higher Education*, August 15, 1997. A sobering view of today’s learning tools.

Alison Schneider, “Insubordination and Intimidation Signal the End of Decorum in Many Classrooms.” *Chronicle of Higher Education*, March 27, 1998. The latest challenge? Scary.

Teaching and Technology Techniques for Teachers in
Online Learning Environments:

Sallie J. Johnson, Ph.D. Candidate

CS-109 Course Monitor, Adjunct Instructor

Embry-Riddle Aeronautical University

College of Career Education, Hickam AFB Resident Center, Hawaii

ABSTRACT

When developing and delivering instruction, whether online or not, the use of technology is secondary to well-designed learning goals and objectives. What distinguishes online instruction and technology in the classroom from entertainment or recreation is the conceptual development of teaching techniques based on solid learning theories. This paper proposes a conceptual framework for implementing teaching and technology techniques for online learning environments.

INTRODUCTION

It is imperative that educators provide adult students with the technological tools they need to utilize the learning resources currently available to them (Thomas, 1996) in addition to challenging, well developed in-class teaching techniques. Collis (1996) believes that the World Wide Web (Web) is the medium most likely to result in a significant breakthrough and future usage for education in providing students with technological tools and information.

The phenomenal growth of the Internet over the last few years, coupled with the development of various multimedia applications, presents exciting opportunities for educators. With the modern day Internet, music can be played, videos can be viewed, e-mail can be sent, airplane reservations can be made directly with the airline companies, packages shipped by UPS can be tracked from home, and video and text based "multimedia" libraries can be accessed (Wolf, Liang, Kozuch, Yu, Phillips, Weekes, & Debruyne, 1996). What could be the potential to have this power from any access anywhere in the world? This potential and resource is now being addressed by the academic world with on-line learning environments like technological mediated learning and distance learning programs.

In the context of online learning environments, the Web provides not only a wonderful opportunity, but also a unique challenge to geographically dispersed professors and instructors. As

a new delivery mechanism for course material, the Web has the potential to allow students to take a course from anywhere in the world (Benyon, Stone & Woodroffe, 1997). Although Web technology has great potential for education, it is imperative that better tools and understanding of the pedagogic impact are needed to implement online learning environments. Effective conceptual guidelines and framework must be developed to help teachers implement instructional techniques that are based on known and proven learning theories and human computer interaction studies.

In addition to the conceptual instructional guidelines, high level multimedia development tools are needed which will enable the development of courseware with a consistent look and feel. Authoring and delivery tools are needed that will allow the control of information and how it is presented along with the control of navigation between pages. Moreover, educators need to integrate personal and shared communication spaces in order to exploit the power of the medium; a tight integration of media, an opportunity to learn from colleagues and enhanced interactivity of the course. At present, the Web does not provide educators with these things. The primary lesson for educators using the Web is that an incremental development approach, driven by sound pedagogy is of vital importance (Benyon, et al, 1997).

THE ONLINE LEARNING ENVIRONMENT

Across the world pages of notes, copies of overhead transparencies and other teaching materials have been made available to students. These materials frequently contain links that take the reader to other pages of related information. It is natural, then, that distance learning institutions should seek to exploit this technology - allowing students to study from anywhere in the world. As the access to new technologies has increased, so has their consideration for use in teaching.

Although a body of knowledge has accumulated concerning hypermedia and hypertext systems (e.g. Nielsen, 1995; Barker, 1993; Cotton and Oliver, 1992; Bieber, Vitali, Ashman, Balasubramanian, & Oinas-Kukkonen, 1997), there is still little specifically on the Web as a teaching medium (Benyon, et al, 1997).

It has been recognized that the Internet is suited to distance learning and technological enhancement for classroom teaching for such reasons as it is ubiquitous, flexible, timeless, and interactive (Kenney, 1996). However, the bulk of the available information to do with Internet teaching does not concentrate on the instructional design or the teaching support aspects required for teaching and learning via the Internet but on the design of Webpages themselves, and how to make them interactive for learning (Benyon, et al, 1997).

THE NEED FOR A CONCEPTUAL TEACHING MODEL

In the new online learning environment, both the teacher and each student are challenged by new roles, functions, and tasks they need to perform. While instructors are asked to articulate more clearly their goals and methods to others in the development team, students are also asked to take more responsibility for their learning (Berge, 1996). It takes time for the instructor to develop effective use of technology in the classroom and the use of mediated instruction in addition to the classroom. Additionally, it is very important to understand that it takes even more time for students to learn in this environment. Moreover, without the right guidelines or framework, the student could even learn less with greater technology available than by reading the textbook and attending the lectures in a traditional classroom setting.

Through the desktop, computer students have access not only to the Internet as it currently exists, but also to an enormous database of information that pertains directly to their classes or jobs. Most of the information is in the form of text, but the library also contains audio and video clips, diagrams, schematics, blueprints, charts and graphs. These electronic libraries are stocked with the equivalent of buildings full of books, journals, and magazines. Sounds wonderful, but that is not teaching or training, that is an electronic athenaeum.

It is a collection of subject support material, text aids and job related

information. Sure, the student can load reference documents or the company policy manual onto a server, but the only thing that has been replaced is the paper manuals; training and teaching has not been replaced. As an example, this is a different way to deliver the preflight checklist to the pilot; it is no substitute for the flight simulator (Gordon, 1997).

It is important to realize exactly what is available on the Web. So much is available and in so many different forms that students and faculty alike are bombarded with current information as well as with counterfeit ideas and rumors. It is vital for the instructor to guide the student through the enormous databases of information on the Web, deciphering what is truthful and which is not. Without a firm framework for teaching on the Web, teachers find themselves just as lost as the students they guide through the databases of information.

Additionally, to be successful, most on-line instructional situations need to promote and stimulate discussion among the students. This has proven to be more illuminating and conducive to learning than the one way transmission of facts and information from teacher to student that normally occurs in these environments. Online instructors need to be aware that this can make some students and faculty profoundly uncomfortable and take positive steps to build both confidence and communicative competence in online instruction (Berge, 1996).

DIFFERENT LEARNING AND TEACHING STYLES

Many universities and companies have used advanced technology, including intelligent modeling of the domain and the presumed knowledge of students, to build intelligent multimedia tutoring systems. Simulations, animations, sound, and videos are used to keep students learning and active. However, flashy graphics and simulations alone are not enough. For students to learn, the experience has to be authentic and relevant to their lives. Therefore, students are placed in situations where they solve problems while the system reasons about the problem being solved and about how to best respond to the students' idiosyncratic actions (Woolf, 1996).

There are many different instructional approaches and teaching styles which include lectures, demonstrations, quizzes, mentoring, counseling, audio and video clips, projects, simulations, role-playing, competitions, etc. What might work for one teacher in one subject might or might not work with another class or subject. Therefore, keeping sound adult learning theories in the design and structure of a class is of vital importance. For example, nothing facilitates a smooth instructor delivery more than properly prepared classroom materials. A set of clear and concise transparency overlays or graphical presentation slides improves not only the students' comprehension, but also allows the instructor to maintain eye contact and a conversational presentation style (Madland, 1998). However, in a

lab or technology based course, hands-on activities should be geared toward the students' specific needs with the subject matter. The finest and best-developed lecture would have little or no meaning without the hands-on or experiential learning step. This step helps the student to fully incorporate the kinesthetic mode of learning into their experience and feel the techniques they are learning are applicable and useful to their lives and jobs.

THREE ADULT LEARNING THEORY MODELS FOR ONLINE TEACHING

If educators can communicate a variety concepts in a manner that includes a variety of techniques and delivery methods, chances are more students in a class, both online and in the traditional classroom setting, will be able to comprehend and retain (Sethi, 1998) the knowledge imparted. As greater numbers of faculty rely on mixing delivery methods for communicating content, including on-line learning environments, it will become more and more important to have a well founded learning theory basis and for educators and their classes.

Three of the most relevant and proven adult learning theories of our time were chosen to develop a sound basis for the conceptual online teaching model. These three theories are (1) Gagné=s Instructional Design Theory (1988, 1992), (2) Knowles' Andragogy (1984), and (3) Gardner's Multiple (MI) Intelligence theory (1983). Based upon these theories, a conceptual comparison

chart was designed (appendix 1).

GAGNÉ=S INSTRUCTIONAL DESIGN THEORY

Gagné's instructional theory has three major elements (Gagné & Driscoll, 1988). First, it is based on a taxonomy, or classification, of learning outcomes. Second, it proposes particular internal and external conditions necessary for achieving these learning outcomes. Third, and last, the theory offers nine events of instruction, which serve as a template for developing and delivering a unit of instruction.

This theory stipulates that there are several different types or levels of learning. The significance of these classifications is that each different type requires different types of instruction. Gagné identifies five major categories of learning: verbal information, intellectual skills, cognitive strategies, motor skills and attitudes. Different internal and external conditions are necessary for each type of learning. For example, for cognitive strategies to be learned there must be a chance to practice developing new solutions to problems; to learn attitudes, the learner must be exposed to a credible role model or persuasive arguments (Terrell, 1996).

Gagné suggest that learning tasks for intellectual skills can be organized in a hierarchy according to complexity: stimulus recognition, response generation, procedure following, use of terminology, discriminations, concept formation, rule application, and problem solving. The primary significance of the hierarchy is to identify prerequisites that

should be completed to facilitate learning at each level. Doing a task analysis of a learning/training tasks identifies the prerequisites. Learning hierarchies provide a basis for the sequencing of instruction. In addition, the theory outlines nine instructional events and corresponding cognitive processes. These events should satisfy or provide the necessary conditions for learning and serve as the basis for designing instruction and selecting appropriate media: (Gagné, Briggs, & Wage, 1992).

Gain attention: Reception

(e.g. present a good problem, a new situation, use a multimedia advertisement).

Informing learners of the objective or describe the goal: Expectancy

(e.g. describe the goal of a lesson (task), state what students will be able to accomplish and how they will be able to use the knowledge, give a demonstration if appropriate).

Stimulating recall of prior knowledge: Retrieval

(e.g. remind the student of prior knowledge relevant to the current lesson (facts, rules, procedures or skills). To show how knowledge is connected provides the student with a framework that helps retrieval.

Presenting the Stimulus (material) to be learned: Selective Perception.

(e.g. Present text, graphics, simulations, figures, pictures, sound, etc. by following a consistent presentation style, chunking of information (avoid memory overload, recall information. Tests can be included).

Provide guidance for learning:

Semantic encoding

(Presentation of content is different from instructions on how to learn. Should be simpler and easier than content).

Elicit performance "practice":

Responding.

(e.g. let the learner do something with the newly acquired behavior, practice skills or apply knowledge).

Provide informative feedback:

Reinforcement

(e.g. show correctness of the student's response, analyze learner's behavior (or let the student do it), maybe present a good (step-by-step) solution of the problem.

Assessing Performance:

Retrieval

(e.g. Assess performance test, see if the lesson has been learned. Also, give general progress information).

Enhance retention and transfer: Generalization
(e.g. Inform the learner about similar problem situations, provide additional practice. Put the learner in a transfer

situation. Maybe let the learner review the lesson.

MALCOLM KNOWLES' ANDRAGOGY, OR ADULT LEARNING THEORY

Malcolm Knowles' learning theory (1984), or andragogy, was specifically formulated for adult learning. The theory was developed as a response to the idea that the popular pedagogy, or learning theory as it related to children, was not adequate when recognizing the special needs of the adult student.

Andragogy focuses on the premises that (1) adults need to know why they need to learn something, or its significance with relation to their work or personal lives, (2) adults need to learn experientially, (3) adults approach learning as problem-solving, and (4) adults learn best when the topic is of immediate value and has relevance to their work or personal lives (Terrell, 1996).

Knowles produced theoretical support for his assumptions that adults need to focus more on the process and less on the content being taught. Strategies such as case studies, role-playing, simulations, and self-evaluation are most useful. Therefore, according to the theory of andragogy, instructors must act the role of facilitator rather than that of the lecturer (Knowles, 1984) which is very different from the lecture format of today's traditional college classroom. The basic andragogical principles are:

Adults need to be involved in the planning and evaluation of their instruction.

Experience (including mistakes) provides the basis for learning activities.

Adults are most interested in learning subjects that have immediate relevance to their job or personal life.

Adult learning is problem-centered rather than content-oriented.

Additionally, Knowles (1984, Appendix D) provides an example of applying andragogy principles to the design of personal computer training.

There is a need to explain why specific things are being taught (e.g., certain commands, functions, operations, etc.).

1. Instruction should be task-oriented instead of memorization -- learning activities should be in the context of common tasks to be performed.

Instruction should take into account the wide range of different backgrounds of learners, learning materials and activities should allow for different levels/types of previous experience with computers.

Since adults are self-directed, instruction should allow learners to discover things for themselves, providing guidance and help when mistakes are made.

GARDNER'S THEORY OF MULTIPLE INTELLIGENCE (MI)

The theory of multiple intelligences (MI) suggests that there are a number of distinct forms of intelligence that each individual possesses in varying degrees. In recent years Gardner's theory (1983) of multiple intelligence types has been a major force seeking to redefine intelligence and influence educational reform. A pivotal aspect of the MI theory is the recognition of a learners' overall intelligence being a function of seven types of intelligences (Sethi, 1998). These seven types of intelligences are:

- linguistic / verbal
- logical / mathematical
- bodily / kinesthetic
- musical
- interpersonal (social skills)
- intrapersonal (insight,
metacognition)
- spatial / visual

According to Gardner, the implication of the theory is that learning/teaching should focus on the particular intelligences of each person. For example, if an individual has strong spatial or musical intelligences, they should be encouraged to develop these abilities. Gardner points out that the different intelligences represent not only different content domains but also learning modalities. A further implication of the theory is that assessment of abilities should measure all forms of intelligence, not just linguistic and logical-mathematical (Terrell, 1996).

Gardner (1983, p. 390) describes how learning to program a computer might involve multiple intelligences.

"Logical/mathematical intelligence seems central, because programming depends upon the deployment of strict procedures to solve a problem or attain a goal in a finite number of steps. Linguistic intelligence is also relevant, at least as long as manual and computer languages make use of ordinary language. An individual with a strong musical bent might best be introduced to programming by attempting to program a simple musical piece (or to master a program that composes). An individual with strong spatial abilities might be initiated through some form of computer graphics -- and might be aided in the task of programming through the use of a flowchart or some other spatial diagram. Personal intelligences can play important roles. The extensive planning of steps and goals carried out by the individual engaged in programming relies on intrapersonal forms of thinking, even as the cooperation needed for carrying a complex task or for learning new computational skills may rely on an individual's ability to work with a team. Kinesthetic intelligence may play a role in working with the computer itself, by facilitating skill at the terminalY"

HUMAN COMPUTER INTERACTION

In addition to sound adult learning theories, when implementing new technology in classroom situations, the psychology and study of human-computer interaction must be taken into account as well. Human-Computer Interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them (Hewett, Baecker, Card, Carey, Gasen, Mantei, Perlman, Strong, & Verplank, 1992). Human-Computer Interaction (HCI) is the study of people, computer technology and the ways these influence each other. The study of HCI determines how computer technology can be more usable by people (Dix, Finlay, Abowd & Beale, 1993). HCI is about designing computer systems that support people so that they can carry out their activities productively and safely (Preece, Rogers, Sharp, Benyon, Holland, & Carey, 1994).

The instructor must be knowledgeable of the fact that when a student is interacting with a computer system, two highly complex information processors are effectively conducting a dialogue. One of these, the student, will be engaged in some purposeful activity that is directed toward achieving a task objective for the university class. The other, the computer system, is the tool that mediates the achievement of that objective. Both parties in the dialogue are manipulating and acting upon

information that represents ideas or entities in a particular task domain (e.g. spaceships in a learning based simulation game; homework documents done on a wordprocessor; or even a computer program itself) (Barnard, 1995).

When choosing online instruction, instructors must be very careful to select products and tools designed with proper HCI interfaces. Design is extremely important to proper facilitation of learning.

The human mind is exquisitely tailored to make sense of the world. Give it the slightest clue and it will provide explanation, rationalization, and understanding. Consider common objects, books, radios, kitchen appliances, office machines, and light switches that make up everyday lives. These well-designed objects are easy to interpret and understand. They contain visible clues to their operation. Poorly designed objects, like universal remote controls and VCRs, can be difficult and frustrating to use. They provide no clues, or sometimes even provide false clues. They trap the user and confuse the normal process of interpretation and understanding. Alas, poor design predominates. The result is a world filled with frustration, with objects that cannot be understood, and with devices that lead to error (Norman, 1988).

Despite its importance, the user-interface design is one of the most poorly understood aspects of most computer systems. Complex, subtly interrelated issues determine the success or failure of the user interface. For example, is it responsive or sluggish, forgiving or

intolerant of human error, easy or difficult to learn, effortless or awkward to use? Even whether or not it is attractive and fun to use can make a crucial difference (Baecker, Grudin, Buxton, & Greenberg, 1995).

People and computers have quite different, often even opposite, capabilities (see Appendix 2). With a well-designed interface, humans and computers should augment each other to produce a system that is greater than the sum of its parts. Computers and humans share responsibilities, each performing the parts of the task that best fit each one's capabilities. The computer enhances our cognitive and perceptual strengths, and counteracts our weaknesses (Baecker, et al, 1995).

INSTRUCTIONAL METHODS AVAILABLE FOR ONLINE INSTRUCTION

Once the foundational adult learning theories and HCI components are identified, then the selection for instructional methods is important. Exactly, what is on the Web and how does a teacher find out what is available to them to use? One great resource that instructors have available to them is a publication entitled Syllabus (1998). This magazine based on technology for education is sent free to educators ten times a year for those who subscribe. Additionally, the Website at <http://www.syllabus.com/> lists information for Syllabus Press sponsored and co-sponsored workshops and conferences.

Many textbook publishers now

offer Web instructional technology packages to teachers who teach for Universities that adopt their textbooks. One such example is Irwin/McGraw-Hill found online at <http://www.mhhe.com/>. Their information technology textbook has a programmed WebPage located at <http://www.mhhe.com/cit/concepts/pace/>, which has Web exercises for students and Web resources for the teachers.

Another great resource the Web itself is a great resource for faculty members to find good instructional reference and methods. The best examples of information and ideas are other educational institutions identified by the ".edu" in the address found easily with Web search engines like <http://www.dogpile.com/>. Dogpile searches all other search engines on the Web making it quite simple to find anything quickly. A Dogpile search located the

Yahoo Education:Instructional Technology:Online Teaching and Learning:Teacher Resources page at URL address:

http://www.yahoo.com/Education/Instructional_Technology/Online_Teaching_and_Learning/Teacher_Resources/ which lists many technological research links and resources for teachers who want to implement technology in the classroom.

A good example of information about other universities that was found on the Web was Kent State University.

DISTRIBUTED LEARNING AT KENT STATE

Kent State University was confronted with the problem of how to overcome the obstacle that exists between teachers and students who are not face to face in the same classroom. It would be a challenge for Kent State, a university with 150 miles separating the two most distant sites. By using new methods of information technology, Kent State launched the Distributed Learning Pilot Program, supported by desktop video conferencing and distributed multimedia content. Using LearnLinc, a PC-based distributed learning software environment from ILINC, Interactive Learning International Corporation, students and teachers are able to see each other in real-time, ask and answer questions immediately, solve problems collectively with other students, and interact as if they were in the same room together (Technology Across the Campus, 1997).

Additionally, the LearnLinc Question and Answer function allows professor to immediately assess students' levels of knowledge of course content. Students are presented with questions on their computer screen, which they answer on-line. The instructor gets an immediate reading of the percentage of students answering correctly or incorrectly. The results give the professors an idea about whether students are actually understanding material being presented. The electronic hand-raising feature of LearnLinc allows the instructor or the students to ask a

question at any time (Technology Across the Campus, 1997).

This type of interactive software could be very useful for Embry-Riddle Aeronautical University College of Career Education with over 110 remote locations all over the world. Interactive teaching and communication is a vital link in the student/professor relationship.

Andy Grove, who in addition to running Intel also teaches a strategic management course at California's Stanford University, understands this only too well. "Teaching requires a level of mutual trust and comprehension between human beings that is timeless" (Syrett, 1997).

MIRABILIS= ICQ AND EMAIL USAGE

Another great teaching tool online is the use of a chat room and electronic mail. One great free shareware program available to all on the internet is Mirabilis= ICQ. ICQ is a revolutionary, user-friendly Internet tool that informs the user who is on-line over a TCP/IP connection at any time and enables the user to contact them at will. There is no need to search for friends or associates on the Net because ICQ does the searching for each user, and alerts him or her in real time when selected friends, associates, or students log on. The need to conduct a directory search each time a user wants to communicate with a specific person is eliminated (ICQ, 1997).

With ICQ, users can chat, send messages, files and URL's, or play games. It lets you choose the mode of communication you wish to employ.

Regardless of the application, be it chat, voice, whiteboard, data conferencing, file transfer or Internet games, ICQ will send and receives the entire messages across in real time. ICQ supports a variety of popular Internet applications and serves as a Universal Platform from which can be launched any peer-to-peer application (such as Microsoft NetMeeting or Netscape CoolTalk). It can also be used in a multiple-user mode, so groups can conduct conferences or just converse on-line (ICQ, 1997).

ICQ is very simple to use and install. When installed, ICQ, the program asks the user to register at a server, which is connected to a broad network of servers spanning the Internet. At the time of registration, the user receives a unique UIN (Universal Internet Number). In addition, ICQ gives the user the option of entering personal information along with your UIN. This allows other ICQ users to recognize them when they log on. Once registered, the user can compile a selected list of friends and associates. ICQ uses this list to find selected friends and associates for the user. Meanwhile, ICQ waits quietly in the background without interrupting any other applications in use. As soon as the user logs onto the Internet, ICQ automatically detects the Internet connection, announces the users presence to the Internet community and alerts the user when friends or associates sign on or off (ICQ, 1997).

The educational uses of Achat@ are limitless. Chat, like e-mail, is a viable communications tool. The term e-mail is actually a misnomer. The technology's

better name is "shared-idea network"--an information system that provides give-and-take. In other words, e-mail is a flexible and rapid format that encourages (almost demands) two-way communication (Federico and Bowler, 1996). If e-mail is a Ashared-idea network,@ then rapid usage of TCP/IP chat rooms is an even more powerful real-time educational tool. According to a survey of corporate communicators from 93 Fortune 500 companies, conducted by Cognitive Communications Inc., 42% of all employee communications will be delivered through e-mail by the end of 1997. In fact, the survey says that within the next three years, major companies will communicate by-mail as frequently as they communicate by print (Federico & Bowley, 1996).

WEBPAGE BASED Computer Mediated Information Exchange (CMIE)

Psychologists have found that music -- especially Baroque music (the music of Handel, Bach, Vivaldi, etc.) -- when it accompanies new information, helps left/right brain linkage. It creates an auditory and rhythmic association with the material being presented and it promotes a state of relaxed awareness that stimulates an alpha brain wave pattern (Doyle, 1991). With music in mind, the new computerized WWW technology of multimedia and the power of the personal computer now allows independent, continuous speech recognition and longtime playing of various musical masterpieces (Hemphill

and Thrift, 1995). A well-developed Webpage, using music and speech interfaces, along with other multimedia enhancements, while supplying the students with all pertinent course facts allows easy information exchange and an accelerated growth path for adult users. This concept is displayed in the Computer Mediated Information Exchange for student and faculty interaction. (Johnson, 1997).

A Computer Mediated Information Exchange (CMIE, pronounced "See Me is a technological enhanced system that allows electronic communication from an instructor to a student. This communication must allow for easy access to class information, use existing equipment, provide feedback -- either real-time or posted -- and allow interaction between student and instructor without a face-to-face meeting. A state-of-the-art CMIE is a multimedia learning experience. This multimedia learning experience, designed with human-computer interaction criteria, is a highly engaging presentation of content that is informative, intrinsically motivating, enjoyable, and makes learning easy. Key characteristics of this type of program include learner control. The greater the learner's control, the more interesting the information becomes, and in turn, the more likely the user will literally learn from the Computer Mediated Information Exchange. The state-of-the-art CMIE could incorporate distance learning technologies such as satellite teleconferencing communications, and desktop video conferencing such as the

distributed learning software environment from ILINC (Technology Across the Campus, 1997). Or the CMIE could use wireless digital personal communications services (PCS) incorporating Multimedia PCS or other anticipated wireless services that allow real-time information and remote linked classroom sites (Johnson, 1997).

The state-of-the-art CMIE would allow the college professor to provide information on the subject as well as encourage students to decipher the wealth of knowledge available on the Internet and other electronic sources. An excellent example of a futuristic model that could be incorporated into all distance learning environments is ZDNet University (ZDU). ZDU is an online learning community that offers classes in computer-and Internet-related topics for a monthly subscription of only \$4.95 a month. The subscribers can take as many classes as they want, have live on-line chats with other students and with the instructor and have access to a great resource library and help desk (ZDNet University, 1997).

According to adult learning theories, facilitation and responses are extremely important to learning. The human brain has enormous potential and it is capable of much more than is currently being developed in schools and universities. If teachers believe in their students' abilities to learn and if they convey this confidence using positive suggestions and positive feedback, thereby boosting the student's self-esteem, the student's learning will become accelerated and highly

successful. Unfortunately, the reverse is also true. If teachers attempt to double their students' abilities without positive suggestions and positive feedback, the students will be more inclined to fail - executing a self-fulfilling prophecy (Doyle, 1991). Communicating over the CMIE, by using e-mail or a "chat" mode, the instructor can instantly give positive feedback, constructive criticism, and helpful information to their students at a time convenient to the student's busy schedule (Johnson, 1997).

GUIDELINES FOR CLASSROOM AND WEBPAGE PRESENTATIONS

The importance of understanding the limitations of working with technology displays is of great importance in HCI design considerations when implementing presentations in the classroom and on Webpages. Using presentation applications like Microsoft PowerPoint, Lotus' Freelance Graphics, Harvard Graphics, or Corel Presentations present HCI design problems. The limitations are similar whether implementing the presentation on-line or in the classroom. Fonts and colors play a major factor in the design of the Webpages and presentations. Many colors bleed over other colors and font sizes and shapes have limitations. The best way to make sure of the effect of the design is to have others view it before it is produced for student usage.

Classroom presentations using the TV/VGA converter have severe design limitations, although the use is of vital importance. TV picture tubes were not designed to deliver the sharp images

computer monitors do. This, combined with the inherent weaknesses of the TV video signal, imposes restrictions on TV typography. The edges of characters tend to blur. If the presentation spaces characters too tightly, they can appear to run together. Also fonts with thin stems and serifs such as Helvetica Light are likely to appear blurry and hard to read. Faces with lots of variation between the thick and thin portions of characters will also cause problems; the thin portions will practically vanish. For best results use a sturdy, bold face such as Ariel or Helvetica. For a serif typeface, Century Schoolbook works well; there's less contrast between the thick and thin portions of its characters. Avoid small typeface, the title text should generally be no smaller than 14-point. When using color there is an added cautionary consideration. Where color is concerned, TV's limitations stem from the design of the TV signal. In a computer monitor, the red, green, and blue video signals travel in separate wires. This is why computer monitors are often called RGB monitors. For television, all color information is merged into a single composite signal. This compromise is the primary reason why televisions have a narrower color gamut than computer monitors. Specifically, TVs have trouble with bright, heavily saturated colors (e.g. brilliant reds and yellows). Such colors are prone to blooming (spreading into adjacent scan lines) and, because of their effect on the composite signal, can even cause an audible buzzing or humming (Heid, 1996).

Ten tips on how to create powerful presentations from Barbara Fillicaro, a Chicago-area computer trainer who has been teaching and delivering presentations for eight years, were used (How to make presentations that audiences will love, 1997).

Choose or create a template, including a set of colors and font style, and use that format throughout the presentation. Showing a lot of different styles, colors, and layouts is disconcerting for the audience. If the speaker uses many styles, colors and layout, the audience will focus more on the graphics of the presentation than on what the speaker presents.

Choose a plain font such as Arial and stick with it. Many times when teachers design their presentation, they attempt to use at least half a dozen different fonts for contrast or to prove different points. Too many fonts will make the slides messy and difficult to read. The same rule applies to the effects chosen for slide transitions and bullets. Designing a presentation is a lot like desktop publishing; pick one design and stick to it. If a point needs to be emphasized, then change the color or layout of a single slide. If the same format throughout the presentation otherwise is intact, then the

difference will make it more powerful than if every slide were a different color.

Choose background colors that are appealing without giving viewers a headache. Red and orange are high-energy colors but can be difficult to stay focused on when used excessively. Greens, blues, and browns are mellow but may not be as attention grabbing. A good compromise is to use a lighter version of your chosen color in the background with black or other dark lettering. Additionally, light or white lettering against a dark background is difficult to read, especially if you are 10 to 30 feet from the screen. If light lettering must be used, then it should have a black or dark gray shadow behind the text.

Use complimentary colors those opposite each other on the color wheel. The combination of naturally opposite colors is appealing to the eye. Blue and yellow is the most commonly used complimentary color scheme.

Make the font size no smaller than 22 points for bulleted items and 28 points for the title. If the font is much smaller, the viewer will not be able to read the slide. Additionally, the presentation

should stay below 36 point type -which is half an inch tall.

Keep each bullet point to one line - two at the most. The points do not need to be full sentences, just key words or phrases. Text should cover no more than one-third of the screen. If the material needs to cover more than one-third of the screen, then the point needs to be broken into two or more slides.

Limit the number of bullets on a screen to six (four if contains large titles, a company logo, or other visuals). If too much text is crowded onto the screen, the audience will not read any of it. If the material must appear in the presentation, the ideas need to be broken into two or three slides. This will give each point greater emphasis.

Use clip art, animation, video, and audio only if it serves a purpose. A funny cartoon or video clip that is relevant to the subject then it should be included. However, a picture of a little guy sitting at his computer serves no real purpose except to take up space. When graphics are chosen the question must be asked, does it make the presentation clearer, more interesting, or more entertaining. If it is just

placed for novelty then it should be deleted.

If possible, the presentation should be delivered on the same computer that it was created with. If not, the chosen colors could look washed-out or rough-edged on a lower resolution computer screen or television.

2. Don't use the presentation as lecture notes. The slides should compliment and emphasize what the instructor says, not reiterate it. Most presentation programs have a lecture-note function that allows the speaker to write additional ideas under the slide graphic in their personal notes.

CONCEPTUAL APPROACH MODEL

The conceptual approach model for online teaching techniques was designed in accordance with three adult learning theories (Gagné, Knowles, and Gardner), current teaching techniques and trends, and HCI design concepts. Appendix 3 displays the chart that correlates each theory with its corresponding teaching technique and HCI/online counterpart. The model is designed both as an implementation selection tool and as a checklist for a multimodal teaching approach.

CONCLUSION

Realizing the significance that should be placed on the goal or implementation of using technology, not only in the classroom, but also as a tool

for communication outside of the classroom is paramount. It is important for educators to meet the challenge and incorporate the new trends into their own teaching styles (Frank, 1992).

Alas, the Internet, especially via Transmission Control Protocol/Internet Protocol (TCP/IP) connections affords a unique opportunity for educators to create rich online learning environments.

Creating a rich online learning environment is a challenging and difficult prospect for educators to effect without some concentrated thought to visual presentation of the course information and activities and the functionality of the interface. The functionality of the interface involves the interaction style (e.g., menus, command, language, graphical user interface [GUI], etc.) that the student uses to communicate with the computer, as well as the navigational process a learner must follow to locate information or complete a task. The visual presentation and functionality of the online course interface form a mirror that reflects how the learning environment will be perceived by students and faculty as a dynamic location for communication and learning (Dringus, 1995).

The conceptual approach to applying adult learning theory to present online and in the classroom techniques upholds the art of teaching in its quintessence. It is the art in training that goes beyond teaching to transform people. This art of teaching takes time and considerable skill. It is important to understand that training will not succeed without a solid foundation in both science and business.

However, that foundation alone is not enough to make people sit up and take notice, or walk out changed. It is the art of teaching that does is the effective change agent of learning. This art of teaching, call it inspiration or creativity, is the least tangible and most powerful ingredient in learning (Cohen & Jurkovic, 1997).

REFERENCES

- Baecker, R., Grudin, J., Buxton, W.A.S., & Greenberg, S. (1995). *Readings in Human-computer Interaction: toward the year 2000*. 2nd ed. San Francisco, CA: Morgan Kaufmann Publishers.
- Barker, P. (1993) *Exploring Hypermedia*. Kogan Page.
- Barnard, P. (1995). The contributions of applied cognitive psychology to the study of human-computer interaction. *Human-Computer Interaction: Toward the year 2000*, 2nd ed. Morgan Kaufmann Publishers, Inc: San Francisco, California. p. 640-658.
- Benyon, D., Stone, D., and Woodroffe, M. (1997). Experience with developing multimedia courseware for the World Wide Web: the need for better tools and clear pedagogy. *International Journal of Human-Computer Studies*. (Vol. 47, No.1). [Accessed on-line (2/98):] <http://ijhcs.open.ac.uk/benyon/benyon-nf.html>.
- Berge, Z.L. (1996). *The role of the online instructor/facilitator*. [Accessed on-line (2/98):] http://star.ucc.nau.edu/~mauri/moderate/teach_online.html.
- Bieber, M., Vitali, F., Ashman, H., Balasubramanian, V. and Oinas-Kukkonen, H. (1997). *Fourth generation hypermedia: some missing links for the World Wide Web*. In S. Buckingham Shum & C. McKnight, Eds. "Web Usability", (Special Issue) *Int. J. Human-Computer Studies*, 47, (1), 31-66. [Accessed on-line (2/98):] <http://ijhcs.open.ac.uk/bieber/bieber.html>.
- Cohen, S. & Jurkovic, J. (1997, November). *Learning from a masterpiece. Training and Development*. (Vol.51, No.11). p. 66-70.
- Collis, B. (1996) *Tele-learning in a digital world: the future of distance learning*. London International Thompson Computer Press
- Cotton, B. and Oliver, R. (1992) *Understanding hypermedia: from multimedia to virtual reality*. Phaidon Press Ltd.
- Dix, A., Finlay, J., Abowd, G., and Beale, R. (1993). *Human-Computer Interaction*. Prentice-Hall. p. xii.
- Doyle, J. (1991, January/February). Innovations in training. *Credit*. (Vol. 17, No. II p. 10-14).
- Dringus, L.P. (1995, Fall). Interface issues associated with using the Internet as a link to online courses. *Journal of Interactive Instruction Development*, (Vol.8, No. 2, p. 16-20).
- Frank, H. (1992, September). Teaching technology and business lessons. *Networking Management*. P. 84, 86.
- Federico, R. & Bowley, J. (1996, January). The great e-mail debate. *HR Magazine*. (Vol. 41, No. 1, p. 67-72).
- Gagne, R. & Driscoll, M. (1988). *Essentials of Learning for Instruction* (2nd Ed.) Englewood Cliffs, NJ: Prentice-Hall.
- Gagne, R., Briggs, L. & Wager, W. (1992). *Principles of Instructional Design* (4th Ed.). Fort Worth TX: HBJ College Publishers.
- Gardner, H. (1983). *Frames of Mind*. New York: Basic Books

- Gordon, J. (1997, July). *Infonuggets: The bite-sized future of corporate training?* Training. (Vol.34, No.7). p. 26-33.
- Heid, Jim. (1996, December). As seen on TV. *MacWorld*. (Vol.13, No.12) p. 173-175.
- Hemphill, C., & Thrift, P. (1995) Surfing the Web by Voice. *ACM Multimedia 95*. San Francisco, CA. p. 215-222.
- Hewett, T., Baecker, R., Card, S., Carey, T., Gasen, J., Mantei, M., Perlman, G., Strong, G., and Verplank, W. (1992). *ACM SIGCHI Curricula for Human-Computer Interaction, Report of the ACM SIGCHI Curriculum Development Group*. p. 5.
- How to make presentations that audiences will love. (1997, March). *Training*. (Vol.34, No.3, p. 54).
- ICQ for Windows 95, Time Limited Free Beta Version. (1997). Mirabilis LTD. [available on-line] www.mirabilis.com/download95.html
- Irwin/McGraw-Hill Publishing Company. A Division of the McGraw-Hill Companies 1333 Burr Ridge Parkway, Burr Ridge, IL 60521. [accessed online 3/98] <http://www.mhhe.com>.
- Johnson, S. J. (1997, November). The development and implementation of a computer mediated information exchange (CMIE) for student and faculty interaction. *Fifth Annual Symposium on Teaching Effectiveness*. Daytona Beach, FL: Embry-Riddle Aeronautical University. p. 9-26.
- Kenney, J. (1996) Integrated Internet Services for In service Training. In *Technology and communications: Catalyst for educational change*, Vol. 2. ICTE New Orleans '96: The Thirteenth International Conference on Technology and Education (New Orleans, March 17-20, 1996). Texas: International Conferences on Technology and Education, Inc. (Vol. 2) p. 452 S 454.
- Knowles, M. (1984). *The adult learner: a neglected species*, 3rd edition. Houston, TX: Gulf Publishing.
- Madland, J. (1998, February). Effective confined space training. *Occupational Health & Safety*. (Vol.67, No.2). p. 32-37.
- Nielsen, J. (1995) *Multimedia and Hypertext: The Internet and Beyond*. London: Academic Press.
- Norman, D. (1988). The Psychopathology of Everyday Things. Chapter 1 in *The psychology of everyday things*. (the design of everyday things in paperback). Basic Books, 1-33.
- Preece, J., Rogers, Y., Sharp, H., Benyon, D., Holland, H., and Carey, T. (1994). *Human-Computer Interaction*. Addison-Wesley. p. 1.
- Sethi, P. (1998, April). Computer-aided graphics and visualization: power tools for teaching and learning. *Syllabus*. (Vol.11, No.8). p. 16,18.
- Syllabus Press (1998). 345 Northlake Drive. San Jose, CA 95117. [Available online:] <http://www.syllabus.com/>
- Syrett, M. (1997, April). Changing the face of learning. Director. (Vol.50, No.9). p. 76-77.
- Technology Across the Campus. (1997, June). *Syllabus*. (Vol. 10, No. 10). p. 37.

Terrell, S. (1996, January). Instructor Notes on Gagné's Conditions of Learning; Knowles' Andragogy Theory, and Gardner's Theory on Multiple Intelligences. *TIPS Theory Database booklet*. DCTE-790 Winter 1996 Institute. Nova Southeastern University, School of Computer and Information Sciences. Thomas, L. (1996). Making the Abstract Concrete. *Syllabus*. (Vol. 9. No. 7, p. 10-12).

Wolf, W., Liang, Y., Kozuch, M., Yu, H., Phillips, M., Weekes, M. & Debruyne, A. (1996). A Digital Video Library on the World Wide Web, *ACM Multimedia 96*. Boston, MA. p. 433-434.

Woolf, B. P. (1996, April). Intelligent multimedia tutoring systems. *Communications of the ACM*. (Vol.39, No.4). p.30-31.

ZDNet University (1997). Located on-line at: <http://www.zdu.com/>

APPENDIX 1

Gagne's 9 Events Of Learning	Malcolm Knowles' Andragogy	Gardner's Multiple Intelligence Theory
Gain Attention	- Understanding why the subject	- Linguistic / Verbal
- Reception	is being taught	- Visual / Spatial
Inform Learner of Objectives	- Involvement in Planning	- Linguistic / Verbal
- Expectancy	- Work Related Significance	- Logical / mathematical
Stimulating Recall of Prior Learning	- Involvement in Planning	- Linguistic / Verbal
	- Self-Evaluation of prior learning	- Intrapersonal
Present the Stimulus (material to be learned	- Significance of Information	- Linguistic / Verbal
	- Focus on Process	- Visual / Spatial
Provide Guidance for the Learner	- Experiential Learning	- Linguistic / Verbal
	- Simulations	- Visual / Spatial
Elicit Performance "Practice"	- Self-Directed Problem Solving	- Bodily / kinesthetic
- Responding	Situations	- Logical / mathematical
Provide Informative Feedback	- Relevance of student	- Linguistic / Verbal
- Reinforcement	responses	- Intrapersonal
Assess Learner Performance	- Involvement in Evaluation	- Linguistic / Verbal
- Retrieval	Process	- Intrapersonal
Enhance Retention and Transfer	- Review of Relevance and	- Linguistic / Verbal
	Significance of what was learned	- Visual / Spatial

APPENDIX 2 Capabilities of computers and People. Adapted from lecture notes,

D.Hill, University of Calgary.

	Computer	Human
Precision and repeatability	X	
Fast and accurate calculations	X	
Reliable memory	X	
Tirelessness	X	
Objectivity	X	
Patience	X	
Physical robustness	X	
Holistic pattern matching		X
Creativity		X
Initiative and exception handling		X
Ability to learn from experience		X
Ability to handle ill-defined problems		X
Good motor skills		X
Judgement		X
Sense of ethics and responsibility		X
Ability to apply social context to task		X
Ability to fail gracefully		X
Flexibility and adaptability		X

Figure 1 (Baecker et al, 1995).

APPENDIX 3

Gagne's 9 Events of Learning	Malcolm Knowles' Andragogy	Gardner's MI Theory	Instructional technique	HCI & Online Selection
Gain Attention - Reception	- Understanding why the subject is being taught - Work Related Significance - Relevance to life	- Linguistic / Verbal - Visual / Spatial - Logical / Mathematical - Musical	- Verbal description / lecture - Marketing of Subject - Attention Step - Advertising Video Cline	- Webpage marketing - General distance learning information - Hypermedia links - On-line syllabus - Multimedia (virtual campus / class tours /
Inform Learner of Objectives - Expectancy	- Involvement in Planning - Work Related Significance - Relevance to life situations	- Linguistic / Verbal - Logical / mathematical - Intrapersonal	- Lecture - Review of syllabus - Demonstrations - Samples	- Webpage details (e.g. On-line syllabus and course objectives) - Hypermedia links to examples / demos of previous classes (e.g. student chronicles)
Stimulating Recall of Prior Learning - Retrieval	- Involvement in Planning - Self-Evaluation of prior learning	- Linguistic / Verbal - Intrapersonal	- Pre-assessment quiz - Student / instructor discussions - Pre-test for self-evaluation	- On-line pre-test, pre-assessment exam, or self-assessment evaluation quizzes - Listserve or discussion forums for sharing and planning for the course
Present the Stimulus (material to be learned) - Selective Perception	- Significance of Information - Focus on Process - Problem Centered	- Linguistic / Verbal - Visual / Spatial - Logical / Mathematical - Musical	- Lecture & Elaboration - Graphical Presentations - Audio & Video	- CMIE (scheduled chats, listserves, discussion groups) - Email - Graphical presentation of chapter summaries - Multimedia based Audio
Provide Guidance for the Learner - Semantic Encoding	- Experiential Learning - Simulations - Small Group discussions	- Linguistic / Verbal - Visual / Spatial - Logical / Mathematical - Musical - Interpersonal	- Advisement, mentoring - Practice: Small Groups - Practice: Simulations - Practice: Role-	- Multimedia tutorials - Threaded discussion groups - Listserves(chat rooms) - CMIE: chapter reviews - Online Library resources for research assignments

*Teaching and Technology Techniques for Teachers
In Online Learning Environments*

Gagne's 9 Events of Learning	Malcolm Knowles' Andragogy	Gardner's MI Theory	Instructional technique	HCI & Online Selection
Elicit Performance "Practice" - Responding	- Self-Directed Problem Solving Situations - Role Playing - Case Studies	- Bodily / kinesthetic - Logical / mathematical - Musical - Interpersonal	- Case studies, Q&As - Presentation of projects, Articles - Competitions - Research assignments	- Tutorials - Chatroom & listservs - Q&As - Simulations - Class Challenges & Competitions - Online knowledge and
Provide Informative Feedback - Reinforcement	- Relevance of student responses - Experiential Learning by understanding Correctness and/or mistakes - Involvement in Evaluation Process	- Linguistic / Verbal - Intrapersonal - Interpersonal	- Results & discussions of case studies, posttests and competitions - Return of graded work with descriptive analysis - Assessment: Statistical results - Class ranking	- Personal E-mail & student progress reports - Online private Chats - Chat rooms - CMIE: Student Showcases
Assess Learner Performance - Retrieval	- Progress Reports - Self-Evaluation	- Linguistic / Verbal - Intrapersonal - Interpersonal		- CMIE: Class and test performance statistics - Online post-tests
Enhance Retention and Transfer - Generalization	- Review of Relevance and Significance of what was learned	- Linguistic / Verbal - Visual / Spatial - Intrapersonal	- Lecture: review of relationship between objectives and learned principles - Samples and Demonstrations	- CMIE: Review of course material on Web with significance and relevance detailed - Student showcases of best work done in class

(Johnson, 1998).

THE AUTHOR

Sallie J. Johnson is the Center Director for Hickam AFB Resident Center, adjunct faculty member, and the CS-109 Introduction to Computers Course Monitor for the Extended Campus of Embry-Riddle Aeronautical University. She is a Ph.D. Candidate in the Computer Technology in Education program at Nova Southeastern University in Ft. Lauderdale, Florida. Ms. Johnson has been an adjunct computer and managerial faculty member for over six years teaching for Embry-Riddle Aeronautical University in Corpus Christi, Texas, Wheeler AB in Hawaii, at Hickam Resident Center in Hawaii and the University of Maryland, Asian Division in Okinawa, Japan. She holds a Master of Arts degree in Human Resource Development from Webster University where she graduated with honors. Additionally, Ms. Johnson holds a Bachelor of Science Degree in Psychology and Education from the University of the State of New York, and an Associate of Science Degree in Music and Education from the University of the State of New York. In 1984, Ms. Johnson was selected as one of the Outstanding Young Women in America by Who's Who. She was recognized in the National Dean's List in 1992 for a 4.0 Masters Degree GPA, was awarded the Who's Who Among America's Teachers recognition in 1994, and was recognized in the Who's Who among American Professionals in 1997 and 1998.

TECH'KNOWLEDGE'Y ANXIETY

BY

Wm. Francis Herlehy III, Ph.D.

And

Merodie A. Hancock, Ph.D.

TECHKNOWLEDGEY ANXIETY

ABSTRACT

There is a plethora of literature on educational software and hardware. Equally as much has been written about technology and the learning environment. Conspicuous in its absence is discussion of the liveware component of educational technology, the faculty member.

Changing educational technologies are threatening many faculty members' sense of security and even, in some cases, their very livelihoods. Those faculty members who are willing to face their concerns 'head-on' can learn to convert their apprehension into the motivation needed to make changes that will assure them of success in today's high-technology, learning environment.

Change in educational technology has always been, and continues to be, a constant. This being the case, why do today's educational advances appear to be so much worse than the educational technology changes of the past? The answer lies, at least in some part, in the speed, constancy, scope, and complexity of the current changes. When it appears that rapidly advancing educational technologies will lead to obsolescence, it is logical and expected that faculty will be unsettled.

The faculty member who is technology poor needs to take advantage of every available developmental opportunity to learn even a little bit more about 'techknowledgey'. And, when he or she has mastered what is needed for the current change, it is time to prepare for the anticipated next wave of change. The only thing faculty have to fear is fear itself—and complacency. Faculty members must actively search for the ways needed to cope with the ever-changing educational environment. To maintain a faculty asset of the highest value, colleges and universities must make developmental opportunities related to technological change readily available to all faculty members.

surrounding today's technological advances, it is understandable that some will become unsettled and anxious when they convince themselves that new technological developments might lead to their own obsolescence. This is particularly true given the potential outcomes of converging technologies.

Speed:

Currently, developments in educational technology occur at warp speed when compared to those of the past. As an example, Gutenberg invented movable type in the 1440s, but it was another 480 years before the mechanized typewriter made it possible to set whole lines of type. However, after type produced on machines similar to typewriters became commonplace in the 1950s, it was only twenty years before the development of affordable computers made possible nearly instantaneous typesetting. Here we are less than twenty years after that with desktop publishing making possible the publication of an incredible range of printed matter without even going to a print shop. Today, typesetting is no more than the equivalent of typing. Anything can be done from design to page layout right in the office. There are even those who have predicted that books as we now know them will disappear. While an interesting issue, whether books survive or not should not detract from the meteoric change in how they are published. Authors are quickly becoming their own typesetters. And, their texts can be in our classrooms in

weeks, not months or years.

Constancy:

Through the 1980s, many of us were astonished by the increasing speed of changes in educational technology. The very essence of the educational process was changing. Faculty had to work hard to get up to speed and even harder to stay there. Some had to learn to run with technology just to keep their place. Others had to push themselves to what they felt were intolerable limits. New educational technologies were installed and put into motion. Those who stayed around knew they would catch up and then the pace would slow back down and they could sit back, adjust to, and enjoy their re-engineered learning environment. This just has not been the case and it probably is not going to be in the foreseeable future.

New products that make the educational process more effective and efficient are introduced on a continual basis and at an increasing rate. The faculty member who does not make the rapidly advancing technology part of his or her classroom activity will find students abandoning their classroom for one that does. This may well include getting an education 'on-line' should this better suit the students' needs and expectations. Change in educational technology is not going to stop. It is the faculty member's responsibility to be there with the changes in hand.

Scope:

Advances in communication technologies have forever changed the means by which both faculty and student research will be conducted in the educational setting. They have created the potential for an 'as of yet unknown' number of new ways to deliver the curriculum to the student. Universities have access to educational markets they could never have dreamed possible. The educational process is set to become a global affair. As of yet, the educational leaders of no other country have assigned the international perspective to the process as have the educational visionaries of this nation who are espousing what is truly distance learning.

Complexity:

Today's instructional technologies involve a great array of mysterious possibilities—data repositories, data base management, mathematical manipulators, graphics' illustrators, computer-aided design and manufacturing, Internet, Intranet, and Ethernet. When one's day-to-day use of technology has been limited to word processing and an e-mail system, all of the features displayed on a menu can make even the most intrepid educator feel that he or she will never be able to conquer this monster known as instructional and communication technology. The anxiety of using new instructional technologies is real. There is no need for it to be any greater than

the anxiety that accompanies learning anything new, such as learning how to use the new instructional technologies and how to make them effective and efficient tools in the repertoire of a capable educator. Our students have not learned the fear and anxiety of taking on the monster. In many cases, they have turned the monster into a toy.

Obsolescence:

Another reason for educator anxiety is that each time something new comes along, something else seems to become obsolete and soon disappears. If it is the work that you (the personal you) are doing that is being displaced by instructional technology, brushing up on an existing skill or adding a new skill to an existing repertoire is not going to be enough. Educators must replace all of the old skills that are becoming useless; 'becoming useless' in the eyes of someone other than their self. The manual manipulation of an equation in a linear programming course on the chalkboard should be replaced with the presentation of a computer program that will accept student input, manipulate the numerical data, and provide students with an answer to the problem. The role of the faculty member is to guide the student through the process. The guide at the side has replaced the sage on the stage.

Who does not know someone who has lost a job, and cannot find another simply because the work itself disappeared. Machines that produce

blueprints with much greater speed and precision have replaced draftsmen. The world of bank tellers, once a sought-after career path, has become a province of ATM machines. Tickets ordered electronically through the home PC are replacing travel agents. It is not the faculty member who is going to be replaced. It is the educational process, as that faculty member has known it, which is to be replaced. It is the faculty member who will decide what part he or she will play in the changing process.

Hyperbole:

The seemingly constant exaggeration of those who report on educational technology has made some educators phobic about the impact of technology. Many educators have seen technological changes that are taking place today destroy another person's sense of job security; security which had developed from extensive education, job training, and practical experiences.

Some reports have indicated books will disappear within the next five years—for the last fifteen years. Futurists are predicting a world in which we will 'cocoon' and with our home PC: learn; earn; spend; and play. The remarkable increases in the number of people who work at home today does not make the disappearance of the office building seem imminent or even real. The home shopping networks available via television and on-line do not indicate the shopping mall will vanish, not in our lifetimes. People go to malls to see and

to be seen. They go to touch and try on products. Sales clerks are not going to lose their jobs because of electronic retail commerce; though they will if they do not embrace upcoming changes.

Students go to the campus and to the classroom to interact in person with the faculty and other students. The benefits of the social experience on campus and in the classroom are well documented in the educational literature (Astin, 1987).

The hype and advertising surrounding each new advancement in educational technology can be intimidating, even overwhelming, at times. As an example, the growth of the Internet in the 90s is usually described as exponential. However, the growth is only exponential because it started at such a low point and because it has only been widely available for such a short period of time. A recent Gallup Poll indicates that slightly less than 25% of the American people use the Internet at all (USA Today, 1998). Maybe the monster is not such a monster after all.

Convergence:

What is conceivably the most unsettling of educational developments is the convergence of technologies. The merger of communication and information technologies gave us teleconferencing. Communication and information technologies combined with multi-media technology to give us real-time, interactive video-conferencing. The possibilities that might result from

merging technologies, though mind boggling in nature are not immediate.

Many, if not each, of these scenarios may make educators feel uncertain about their future and it is this uncertainty that creates anxiety. The problem of educational and instructional technology getting ahead of the faculty is very real. And, the answer is not, 'Oh well. It's not all that bad. Everyone else is in the same boat.' They are not. Technology poor faculty must seek out ways to cope with their anxiety and undergo personal and personal development programs that will expedite their entrance into the new educational world.

Educators must accept that change is inevitable and that it is constant.

After one has just learned to do something new or to do a significant something differently, it is a typical behavior to sit back, relax, and enjoy the sense of achievement. Some change agents have strongly encouraged just such behavior in the organizational setting. They would have administrators 'unfreeze' the organizational culture; introduce the new technology or process; ensure it was adopted; and then 'refreeze' the culture. The point being that enough time would be allowed to pass between changes to afford some 'time out' while awaiting the next change. With our rapidly evolving educational/instructional technology, that model simply will not work. The educational technology one learns today

might not even be the building block for what he or she will need to learn tomorrow. There is no time for academic deans to unfreeze and refreeze the organizational culture. Faculty must suspend disbelief and get on with the change. They must embrace the learning of new educational technology and processes as a dynamic and on-going progression. Faculty who keep themselves abreast of advancing technologies will minimize their discomfort when the new buzzword (technology) comes on the scene because they will not be dealing with a complete unknown. This responsibility should be subsumed in faculty development. Educators can take comfort in the suggestion of several historians of educational technology that it usually takes five to seven years longer than anticipated for a new technology to become commonplace, if it ever does (Goldberg, 1998).

Prepare for skills displacement and job reengineering.

Several labor economists and futurists have predicted that at least eighty percent of all workers will see their job redefined at some point in their career (Goldberg, 1998). The field of academia is not excluded. Educators must discontinue assigning such a narrow definition to what it is they do. The sage on the stage job concept has been replaced by one requiring both subject matter and educating expertise. The faculty who have the most difficulty with the introduction of changing educational

technologies are often those who have thought of themselves in narrow terms delineated by the specific use to which they have applied their skills, i.e. their field of study. Current research has shown teaching skills requisite to being an effective teacher encompass more than subject matter expertise (Gusky, 1988). Additionally, those instructional factors that are under faculty control have a direct impact on student learning (Levinson-Rose and Menges, 1981). As a result of this research, faculty development has grown to include pedagogical and andragogical skills. Now the process must wholly embrace the use of technology as it impacts student learning.

The faculty development process needs to introduce and nurture hidden or immature skills with applicability to new technology and processes. In addition, educators must do some 'disaster planning'. If truly convinced they are to be replaced with advancing developments in educational technology, they must be prepared to take advantage of professional development programs that will present them with new technologies and instructional skills. Educational institutions on the forefront of faculty development have long provided the training needed by technology poor faculty to develop the skills for using and understanding technology within the classroom. Unfortunately, the bulk of professional development programs have been less encompassing; employing 'hit-and-miss' programs that inevitably 'hit' those who are already technologically

advanced and 'miss' those who believe an ATM card is the cutting edge. The result of these disorganized development programs has left a marked inconsistency in the use of current instructional technology for student learning. Those responsible for professional development have allowed themselves to fall into the undesirable position of being reactive rather than proactive. It is past time for them to develop and implement an effective plan for the complete transition to current educational technologies.

Accountability and accessibility:

When educators accept the fact that advancing developments in educational technology have a half-life the length of today's clothing fashions, accountability becomes a vital issue. Just as the faculty development process has a responsibility to the faculty member so does the faculty member to the educational institution. He or she must buy into the opportunities provided. The institution, on the other hand, must ensure the appropriate professional development opportunities are readily available. As with any adult learning, needs assessments should be used to determine the format, time, and location that will induce the most productive training (Knowles, 1980). The futility of offering an on-line professional development course to the faculty member whom is not computer comfortable should be apparent. Similarly, a professional development course for adjunct faculty scheduled during the traditional workday or at a

distant site is likely to result in minimal attendance.

Anticipate the next change in the educational process.

Faculty must not let an absorption in the immediate effort to master the current change blind them as to what is on the horizon of educational change. There are always signs when change is about to occur. If one is vigilant to what is going on in one's environment, he or she will get a sense of what lies ahead. An essential part of the faculty development process has to be for colleagues to deliberate on any changes they foresee and, much more importantly, to plan for the accommodation of those changes. Several techniques exist to effectively forecast educational change. The use of such practices to proactively address reengineering and technological change is a paramount responsibility of faculty developers. The use of such practices is to be a prime responsibility of faculty developers. Educational institutions providing anything less are guilty of nonfeasance.

Build networks.

Educators cannot wait until trouble arrives to build a network of colleagues. In addition to sharing information about coping mechanisms and technology trends in the educational field, they can learn the instructional skills needed to maintain their value to the student and, thus, to the

organization. Networks of colleagues are built slowly and carefully over a period of time as persons come together to exchange information, and learn to trust and help one another. The faculty development process is an appropriate venue for building these networks. The process should, by its very definition, promote the sharing of information, the building of collegiality and trust, and present the opportunity to help each other evolve as educators. An effective professional development program results in a lasting support network that provides continuous growth while presenting the opportunity to help each other develop as educators and instructional technologists.

Train, evaluate, retrench, and train some more.

Faculty can never afford to pass on the opportunity to learn just a little more about instructional technologies or any other educational skills. They should ask mentors and colleagues to teach them something new. They should insist on faculty development that presents innovative and creative thought, promotes critical thinking, does not get taken over by 'group think', and identifies changes on the horizon as early as possible. A vital goal of faculty development is to prepare faculty adequately for educational change. With the current rate of change in educational technology, this cannot be a 'hit-and-miss' operation. If this development is presented appropriately, faculty can approach the necessary learning and/or

retraining without the sickening fear that accompanies the unknown, promotes anxiety, and makes it so difficult to learn.

If it is not accomplished successfully faculty will retreat to the safe, narrow world of teaching ability defined solely by subject matter expertise; at least, until such time as they are forced from the system or, preferably, induced into a user-friendly, constructive development program.

Understanding the objectives of effective faculty development, knowing how, and why, specific outcome measures were set, and using clearly defined criteria for evaluation will provide the opportunity to assess objectively the effectiveness of development programs in educational technology. Specifically, programs resulting in decreased anxiety by the technology poor faculty and increased adoption of current instructional technology into the educational process will be affirmed. Programs resulting in only a topical understanding of new technology and continued, or perhaps increased, anxiety should be redesigned to meet the needs of the faculty.

Now, let's start it all over again.

Okay, you have done it. A new technology or educational process was introduced and you mastered it. And, it was not so bad after all, was it? Now, for the well deserved rest... Wrong! The next wave of change is just around the corner. There is not enough time to relax. Start figuring out the change.

Spread the word throughout your networks. Get it on the agenda for the next faculty development meeting. I think you get the point. Think of it like driving on ice. You do not fight the skid: you go with the flow.

We live in an educational world where technology brings constant and perplexing changes to our professional lives. The toughest ones to handle are those that affect our livelihood, our hopes and means of providing a future for our families and ourselves. Technology is not going to disappear. The educational process is not going to remain the same. We need a faculty development program that will help us deal with our fears and anxieties and that will present us with the opportunities to master the change and to use the technology to excel as educators.

References

- Astin, J.E., (1987). Socialization on the college campus. Garth, Australia: Innsbruck.
- Goldberg, B., (1998, February). Change anxiety. Educational Review.
- Gusky, T.R., (1988). Improving student learning in college classrooms. Springfield, IL: Thomas.
- Knowles, M.S., (1980). The modern practice of adult education. Englewood Cliffs, NJ: Prentice Hall Regents.
- Levinson-Rose, J., and Menges, R.J. (1981, Fall). Improving college teaching: A critical review of the research. Review of educational research, 51, No. 3 403-434.
- USA Today, (1998). Internet; Intranet; Ethernet. www.usatoday.com

*Using LISTSERVS as
Instructional Tools in the
Modern College Classroom*

**USING LISTSERVS AS INSTRUCTIONAL TOOLS
IN THE MODERN COLLEGE CLASSROOM**

Ronald Earl Clark

Embry-Riddle Aeronautical University

Embry-Riddle Aeronautical University
Extended Campus
College of Career Education
Teaching Effectiveness Symposium
Daytona Beach, Florida
November 4th, 1998

ABSTRACT

Using listservers, or "listservs" as a classroom teaching adjunct in the modern college classroom is becoming a normative behavior for many college professors, teachers and instructors. Commensurate with the explosion of the Internet and World Wide Web, the spread of listservs of all types and description has forever altered our e-mail receipts. As never before, there is an emerging use of the literally thousands of listservs as educational tools. Professors at Kent State University and Embry-Riddle Aeronautical University have been using listservs in the classroom in the 1990s, and have begun to spread the word of this throughout the academic community. The use of listservs in the classroom today is easy to initiate, and there seems to be virtually unlimited potential for listserv educational usage. Emerging as the superstar of listserv configurations is the addition of a WWW library to accompany an interactive listserv. As distance learning and education spool up in earnest, and as more and more educational interest is directed at electronic tools, the "teaching with the aid of listservs" phenomenon only promises to grow.

CHAPTER I

INTRODUCTION

In this chapter, the author will discuss the evolution of listservs, explain how listservs work, identify several different listserv configurations, and cover basic listserv commands. Armed with this knowledge, the reader will be better able to proceed into the realm of the listserv.

The Evolution of Listservs

With the creation of the Advanced Research Projects Agency (ARPA) within the US Department of Defense in 1958, the need for electronic connectivity between ARPA and other entities spawned a network called ARPA Net. This formally kicked off the beginning of the internet as we know it today.

In the 1970s, the communication between ARPA, the military-industrial complex and colleges and universities led to the initiation of the National Science Foundation network, called NSF Net. As the internet began to expand exponentially, the commercial applications using the internet burgeoned. It was in this phase in the 1980s that the concept of electronic mail began to popularize, and thousands of

"internetters" began to send e-mail across the endless connectivity of the internet.

The author is certain that mailing lists have proliferated in American society for some time predating electronic mailing lists, or listservs. Therefore, the concept of joining a mailing list as an individual is not a new idea. With the new electronic connectivity of the internet, mailing lists are being rediscovered, and millions of Americans are subscribing to these mostly free lists. It would not be an exaggeration to suggest that the mailing list phenomenon has spread down as far as grade school age children, who are often more computer literate than their parents. Just as some Americans do not drive, it is also true that some Americans have never turned a computer on.

As commercialization of the internet increased, the concept of computer list servers providing connectivity for participants on e-mail lists began. Lured by these mostly free mailing lists funded largely by academic and private grants, and as entrepreneurial "loss-leader" enticements, listserv participants signed up by the millions in the late 1980s and 1990s. According to Hricko (1998), there were, as of January 14, 1998, over 73, 000 mailing lists, with almost 21 million subscribers sending over 27 million e-mail messages a day.

The author was a late passenger using internet travel, only accessing the internet and e-mail in the 1990s. As a college professor interested in the use of computer technology in the classroom, the author naturally gravitated to the use of mailing lists, or list servers, or "listservs" in the classroom.

How Listservs Work

According to Hricko (1998), list servers are software responsible for the management and distribution of a mailing list. List servers automatically distribute e-mail messages from one member of a list to all other members on that list. Technically, the term "listserv" is used to connote a mailing list software product by L-Soft International.

Hricko (1998) states that when one subscribes to an electronic mailing list, their name and e-mail address are automatically added to that list. Usually, the person subscribing receives a welcome message explaining what the available list options are. Upon subscription, the new member begins to receive list postings in their e-mail. On many lists, one can interactively receive and send e-mail messages to individuals or to "the list". Upon subscribing, one is also given instructions on unsubscribing if the list is not to their liking and needs. At this time, there are many different types of list servers, which will be discussed below.

Listserv Configurations

According to Clark and Getter (1998), there are several types of list

server configurations, ranging from a simple "receipt-only" mailing list to a fully interactive listserv with an accompanying World Wide Web library. As this paper is being written, there are probably even more listserv configurations being developed than will be covered in the following discussion.

Receipt-only Listservs

Clark and Getter (1998) mention AVFLASH, CNET, and IAT Infobits as three "receipt-only" listservers. These listservers allow subscribers to receive periodical e-mail postings, but do not allow subscribers to interact with all of the subscribers on the mailing list. AVFLASH posts a weekly information mailing on aviation and airline related news. CTET also posts a weekly information newsletter to all subscribers listing, among other things, the top computing news items of the week. IAT Infobits publishes a monthly classroom technology newsletter for education and training specialists.

Interactive Listservs

As mentioned by Hricko (1998) and Clark and Getter (1998), a popular form of list server today is one which allows each subscriber to interact either with each other subscriber, or with the entire mailing list. As one might imagine, there are many instances in which one, in attempting to communicate with an individual list subscriber, actually (and unintentionally) communicates with everyone on the list. The Embry-Riddle Extended Campus Faculty listserv is a

good example of this form of mailing list. On this list, there is an e-mail address to subscribe to, and another to address the entire list. Suffice it to say that the webmaster is kept busy as new subscribers inadvertently address the list in their attempts to discreetly address another subscriber.

Interactive Listservs With WWW Library

At this time, the most useful type of listserv is one which allows interactivity of all subscribers, and additionally maintains a WWW library of materials pertinent to the listserv topic. Clark and Getter (1998) describe the Embry-Riddle Crew Resource Management (CRM) Industry Developer's List with WWW library. This listserv hosts approximately 500 of the most prominent and knowledgeable CRM and aviation human factors educators, training personnel and researchers. As a personal subscriber to this list, the author receives approximately 5-10 e-mails a day, is often asked questions by individual members, and communicates with both individual subscribers and the list.

Basic Listserv Commands

Also given to listserv subscribers in the welcome message are the commands which are to be used on the listserv. The following generic listserv commands apply to most list servers.

To subscribe to a list, one writes "subscribe LISTNAME your name", and unsubscribes by sending "unsubscribe

LISTNAME your name". To post a message to the list, one sends a message to the list address, making sure to include an e-mail address where one can be reached. If a command is sent to the list, everyone on the list will receive the message.

According to Hricko (1998), listserv subscribers can also usually review the list, conceal their name, stop mail when on vacation, and receive mail in a digest format when several days mail is desired. In the following chapters, the author will discuss using listservs in the classroom, setting up one's own listserv, and his Embry-Riddle Aeronautical University experience using listservs as a teaching tool.

CHAPTER II USING LISTSERVS IN THE CLASSROOM

There are many academic reasons to use list servers as instructional tools in the modern college classroom. On the Extended Campus of Embry-Riddle, where terms can be as short as nine weeks, the use of listservs takes on additional meaning. In this chapter, the author will discuss teacher and student preparation, using listservs as a supplement to instruction, using listservs for research, and listserv instructional tips .

Teacher and Student Preparation

As both Extended Campus faculty and students prepare for the next nine-week

ERAU term, the use of aviation-specific listservs takes on additional meaning. In addition to the information available on all three forms of listserv discussed earlier, one can also interact with the "experts" in a given field to obtain additional insight. With the advent of the interactive listservs With WWW libraries, one can also obtain, usually free, the latest symposia and conference proceedings as well (Clark & Getter, 1998). Often, listserv subscribers will share academic materials such as lesson plans, syllabi, and bibliographies (Hricko, 1998).

According to Hricko (1998), there are also on-line teaching and learning listservs which offer materials for collaborative teaching projects. These materials, the possibility of receiving the very latest technological information, and the archiving feature of listservs, all combine to make this concept a very valuable academic asset.

Using Listservs as a Supplement to Instruction

According to Karayan and Crowe (1997), college students do gain academically from participation in listservs in conjunction with their college classes. They found that over 50% of the students surveyed (n=96) reported a gain in their learning because of their participation in a listserv for a specific course. Hricko (1998) mentions that listservs develop reading, writing, critical

thinking, and computing skills. This is in alignment with ERAU Extended Campus Computing Across the Curriculum (CATC) initiatives, which recently called for an enhancement in each course in "writing, speaking, and computing across the curriculum".

In her paper, Hricko (1998) emphasizes that a student's interaction with a listserv fosters enhanced reading skills and clear expression, as unclear communications can be witnessed daily. Students generally get many sides to all issues in a listserv discussion, and can more clearly choose their best-fit point of view. As listserv issues roll forth each day, students can choose to accept, reject or synthesize what they read and understand, and generally present more cogent expressions when they communicate their thoughts. It is clear that students develop better research skills because of their listserv experience (Hricko, 1998), and increase their knowledge of a subject (Karoyan & Crowe, 1997).

According to Hricko (1998), listservs enhance the learning of a variety of students with varying learning styles. Reflective learners can read and learn. Curious learners can ask question after question in their quest for knowledge. Sub-lists of specific interest students can pursue their topics in more depth. Everyone can participate unabashedly, with no school bell to signal the end of class.

Although learning through listserv participation in a classroom setting is enhancing to a student's

learning experience in a specific course, their participation in listservs can also extend beyond the semester and classroom, and often does. Collaborative learning on an intercontinental and international basis produces an intensity, variety and motivation which are hard to match in a listserv-less classroom (Hricko, 1998).

In a historical sense, the use of listservs in the college classroom brings the past into the present, with both near-synchronous and asynchronous discussions evident. Retrieval of past discussions through listserv archiving also brings past discussions into the present (Hricko, 1998).

Using Listservs for Research

When the thought of pulling down virtually millions of "hits" from any of several popular WWW search engines on almost any topic seems burdensome and time-consuming, the research capability of listservs can be applied. Using Tile.net, the Directory of Scholarly Conferences and Liszt.com, a student can search for a topic-specific listserv (Hricko, 1998). By subscribing to this listserv, students can hope to obtain very specific academic and research information in a relatively short time, and often can actually converse with the research leaders in a particular field. It is not uncommon to access a very important person more easily through e-mail than through virtually any other means. Apparently, even VIPs pull down their own e-mail from time to time.

In aviation today, especially in the airline industry, the geography and rules change almost weekly. No textbook is able to keep current, and supplemental information and insights are especially invaluable. Through the use of listservs such as AVWEB and the CRM Industry Developer's List, the latest research information can be obtained, often from the Principal investigator him/herself.

By using "full-service" listservs with accompanying WWW libraries, a great deal of current, factual and leading edge information can be found (Clark & Getter, 1998); Hricko, 1998). The author cautions all readers and students to view all listserv, internet, and WWW postings with a critical eye, as in their search for the objective truth in other areas.

Listserv Instructional Tips

The following instructional "tips" are offered as a beginning of the reader's use of listservs in his/her classroom, and are taken largely from Hricko (1998).

1. Several weeks before a class begins, get students to subscribe to specific listservs to enhance students' course knowledge on the first day of class.
2. Survey research and interviews can be done easily through listserv participation.
3. When writing assignments are given, peer review on listservs produces a critical atmosphere which all benefit from.
4. Problem solving on a listserv is almost too easy, as literally thousands of

minds turn to the same discussion.

5. International listserv participation decreases the cost of connecting classrooms all over the world.

6. Faculty and students can take the initiative and create their "own" listserv when available listservs just do not meet their need. The author recently created a listserv to allow other colleges and universities to share in the "Computing Across the Curriculum" experience of ERAU's Extended Campus.

CHAPTER III SETTING UP YOUR OWN LISTSERV

Hricko (1998) prescribes the following procedures for setting up a listserv:

1. Contact your school's system administrator to determine local procedures for initiating listservs.
2. Consult with other similar listserv administrators to determine how they are organized and how they operate. No use reinventing the wheel.
3. Prepare a mission statement for the list, and draft a mini business plan for the operation of the list in very specific detail.
4. Determine your responsibility in Webmaster (listmaster) duties and tasks. Enforce list etiquette rules (netiquette).
5. Use appropriate advertising means to popularize your list to those you intended to use it, and to attract potential advertisers to defray list costs.
6. Allow your list to develop and evolve into a pragmatic educational tool

for both faculty and students alike.

CHAPTER IV AN EMBRY-RIDDLE LISTSERV EXPERIENCE

Clark and Getter (1998) mention several aviation and education specific listservs ranging from receipt-only listservs to interactive listservs with WWW libraries. For purposes of this discussion, the author will examine the ERAU-hosted CRM Industry Developer's List, the Extended Campus Faculty List, and the Computing Across the Curriculum (CATC) Developer's List.

CRM Industry Developer's List

The Center for Advanced Aviation Research (CAAR), located at the Embry-Riddle campus in Daytona Beach, Florida, led the initiation of this list in the early 1990s. The intent was to provide a discussion forum for crew resource management specialists all over the world. In addition, an extensive and complete CRM and aviation human factors WWW home page (library) were added. The author thinks that this is the highest form of listserv currently available, and regards its value as optimum.

At the present time, some 500 prominent CRM/human factors subscribers carry on a daily dialogue which enhances their occupational experience, and renders them more effective in the prosecution of their professional pursuits. The author has

recommended (mandated) that his graduate students in a wide range of graduate aviation courses subscribe to this list. The feedback has been uniformly positive, although the author has felt that his students were somewhat intimidated to "speak" with the CRM/human factors experts they had heretofore only read about in their college texts. To subscribe, contact this list at WWW URL
<www.caar.db.erau.edu/crm>.

Extended Campus Faculty List

On February 10, 1998, this list was initiated to academically tie together over 3,000 adjunct faculty, some 22 Regional Faculty Advisors, and over 120 Resident centers. Since that date, the academic dialogue on this list has been constant, lively, spirited, and very informative. It is the author's impression that ERAU's Extended Campus academic administration, adjunct faculty, regional faculty, and centers have all begun to work with this new communications medium, each in their own way, according to their needs.

This list has been the focal point for a lively series of discussions leading up to the semiannual faculty conference in Daytona beach in June. It appears that more and more adjunct faculty are speaking out (to the whole Extended Campus academic body), resulting in a forum for their academic thought and ideas.

In the past six months, with a change in ERAU's Extended Campus academic leadership, there has been a

very beneficial "passage of the word" concerning all new and updated academic policies. This exchange has, in the author's view, eclipsed all previous academic communication, and sets the stage for an even greater academic communication and camaraderie in the future.

CATC Developer's List

In 1993, a Computing Across the Curriculum (CATC) Task Force was formed on Embry-Riddle's Extended Campus to foster the use of classroom technology leading to enhanced student computing skills. This effort has continued to grow, and, at the present, there is a student performance objective in each undergraduate and graduate course mandating the increase of student computer fluency in each course.

As the CATC effort has pressed on, bringing computer hardware, software and classroom technology teaching methodology into the classroom, many CATC-advocate-professors have begun to write about and present their "CATC" experiences at academic conferences. As this has happened, there has been a movement to record this CATC experience, and to also make it available to the national and international college and university body.

In March of 1998, the beginning of a CATC Developer's List was begun, with the construction of a WWW home page. In the next few months, the associated CATC Developer's List will be initiated, to be fully operational by the Fall of 1998. It is intended that this list

will join together colleagues from colleges and universities interested in beginning, or sharing, their own CATC experiences.

REFERENCES

Clark, R. E., & Getter, W. M. (1998). Enhancing instruction through the use of listserver subscriptions and accompanying WWW libraries. Proceedings of the 1998 Stop Surfing-Start Teaching Conference. Myrtle Beach, SC: Association for the Advancement of Computing in Education (AACE).

Hricko, M. (1998). Listservs as instructional tools: The latest trend in teaching aids. Proceedings of the 1998 Stop Surfing-Start Teaching Conference. Myrtle Beach, SC: Association for the Advancement of Computing in Education (AACE).

Karayan, S. S., & Crowe, J. A. (1997). Student perceptions of electronic discussion groups. [WWW document]. URL <http://www.thejournal.com/past/april/0497feat4.html>

**GUIDELINES FOR USING STUDY GROUPS EFFECTIVELY
IN TEACHING AND LEARNING**

**By
Dolly A. Secrist, M.S.**

Instructor of Aviation Business Administration

Embry-Riddle Aeronautical University

**Instructor of Business and Management
Park College**

Abstract

Instructors face a tremendous challenge when preparing students to enter the 21st Century. This Paper offers some tools to use in meeting this challenge. The Paper discusses some factors instructors need to keep in mind when creating groups, development stages of groups, suggested formats for effective group work, and how group interaction, learning, and productivity are affected. The Paper also offers information on dynamics of study groups, touches on the social benefits the groups derive from task and maintenance functions, and offers rules for groups to perform effectively. The role of the instructor in the group process is explained, and suggestions are offered to assign group grades. The Paper concludes by discussing the advantages of the study group process.

GUIDELINES FOR USING STUDY GROUPS EFFECTIVELY IN TEACHING AND LEARNING

Introduction

How can instructors meet the needs of an ever-changing student population, and the challenges this population faces as they enter the 21st Century? How can instructors help adult learners who, unlike the younger college student, have assumed responsibility not only for accomplishing in the work place but also for continued professional development? What tools can instructors use to help students become productive members of a world where information is multiplying almost as fast as it is becoming obsolete, where skills must continually be upgraded and perfected in order to compete effectively?

One of the answers lies in setting learning objectives to help adult learners achieve their academic goals. These learning objectives should include enhancing self-directed learning through the ever-increasing use of small group dynamics, and developing those interpersonal skills required to participate effectively in study groups.

Why do we place such emphasis on the study group process? For one, the study group process helps adult learners practice interaction skills needed to achieve a common objective, through sharing of talent, experiences, and learning resources. This not only allows learners to assume greater self direction and responsibility for their own learning, but also to share more information in less time and cover more content

than if they were to do it alone. Furthermore, the study group process forces learners to participate actively in their own professional development and to be more responsible for acquiring knowledge and skills, unlike traditional learning environments where students assume a rather passive role. (University of Phoenix, 1992).

Factors to Keep in Mind When Creating Groups

Several factors need to be kept in mind when creating groups. In the first place, groups should be formed on the first class meeting. Doing this enables students to start working on group assignments right away, especially those due on the next class meeting.

A second factor to keep in mind is for students to become familiar with each other prior to the formation of the groups. This can be done through ice-breaking, getting-acquainted, or warm-up activities, always remembering that these activities must never put the students on the spot. Both instructors and students benefit here by having a chance to settle in and get information on the make up of the class. In addition, these activities start the course off in an enjoyable and pleasant manner and make the classroom, the classmates, and even the instructor less threatening.

Guidelines for Using Study Groups Effectively in Teaching and Learning

One ice-breaking activity I have found very helpful and have been using for several years is to ask class members to select a partner and interview each other using the questionnaire depicted in Figure 1. I usually give them six to ten minutes to interview each other, depending on the size of the class, and ask them to switch roles at half time. At the end of the exercise, students introduce to the class the person they have interviewed.

Instructors should give students the responsibility to form their own study groups. Once they are formed, instructors should not change the composition of the groups, unless requested by them. Otherwise the dynamics of the group will be affected, and the learning and performance will suffer.

The next thing to encourage when forming groups is the diversity of backgrounds. Similar experiences and occupations limit creativity. Diverse backgrounds tend to strengthen the learning process, and add a range of disciplines and real-world knowledge, which enhances the creative and critical thinking process.

Geographic proximity of the group members, and time of their meetings, are also important considerations, since during the program they are expected to spend many hours together outside of class. Care should be taken here not to select members on the basis of proximity only, for this would detract from the quality of the learning process.

How many members should a group have?

Four to six members per group would be the ideal number. Groups of less than four students are unable to deal effectively with major group projects. Groups of more than six students need more direction, more structure, and rules to operate and stay focused. Otherwise creativity is reduced and the learning process is affected.

Not all students are familiar with the study group process. Some students may be new to the process, especially in the elective or non-core courses; some of them may be very experienced. The instructor should keep this in mind and, for the benefit of the new students, offer an overview of the study group process.

Group Development Stages

Both formal and informal groups exhibit four development stages: mutual acceptance, decision making, motivation and commitment, and control and sanctions. (Nelson and Quick, *Organizational Development*, 1997).

The first stage in the development of the group is mutual acceptance. The focus here is on interpersonal relations among the members. There is mutual assessment by members regarding emotional comfort, trustworthiness, and group acceptance. Other issues that may also surface are authority, influence, and power, when members with strong personalities try to dominate the process right away. Once a comfortable level of acceptance and mutual trust is reached, members attention can focus on the tasks at hand.

Guidelines for Using Study Groups Effectively in Teaching and Learning

The second stage involves planning and decision making. The focus now turns to those activities having to do with understanding the nature of the group's task, and figuring out how to accomplish it. The issue of authority is very strong here, with the group trying to decide who should be responsible for what, and whether or not they need a primary leader.

Now that tasks and interpersonal issues have been resolved, the group enters the third stage. Here the focus is on motivation of self and other members of the group, especially when it comes to really getting started. Some maintenance functions evident here include encouraging, supporting, acknowledging contributions of others, and establishing performance and evaluation standards for the group. Execution as well as achievement are highly emphasized here.

The final development stage includes controls and sanctions. Now the group has evolved into a mature, productive, efficient, and effective unit. Interpersonal, task, and authority issues have been resolved successfully. Their purpose and mission are clear, everyone understands the performance and behavior expected, the level of cohesion is very high, and the leader-follower relationships are clearly defined. One important issue is worth mentioning here: the group may revert to earlier stages of development if the membership of the group changes through loss of a member or addition of a new one.

Another model of group development identifies five stages: Forming, Storming, Norming, Performing, and Adjourning. (Nelson & Quick, *Organizational Behavior*, 1997).

Some Formats for Group Work

There are several formats available to get students involved in group work. Which one to use depends on the nature of the task, the size and composition of the class, and the instructors' preference.

One of them is called, **□Think-Pair-Share**. Here students are required to either think or write their answer to a question asked by the instructor. Their response should include evaluation, analysis or synthesis. It should also be shared first with a partner, then within a four-person learning team, and ultimately with a larger group or with the entire class. This exercise gives the students the opportunity to learn by reflection and verbalization, and improves the caliber of the discussion. (The Teaching Professor, 1995).

Another format is called, **"Three-Step Interview"**. In this format, students share information with each other during a paired interview. What they learned in this interview is then shared in a four-member learning team. The information could be a reaction to a film or article, or a hypothesis. This exercise can be used as an icebreaker. (The Teaching Professor, 1995).

Guidelines for Using Study Groups Effectively in Teaching and Learning

A third format is called, "**Simple Jigsaw**". The instructor divides the class into teams and an assignment or topic into four parts. One student from each team volunteers to become an "expert" on one of the parts. All the "experts" on each part work together to master it and discuss the best way to help the other students learn it. Then the "experts" go back to their home teams and teach the other group members. (The Teaching Professor, 1995).

A fourth format is called, "**Structured Controversy**." Here the class is divided in teams and assigned a controversial issue. Each team assumes a different position, and is responsible for discussing, researching and sharing its findings with the rest of the class. (The Teaching Professor, 1995).

A different format can be used when assigning responsibility to the group for class sessions. In this particular format, the class is divided in groups of two to three students. Each group is fully responsible for designing and leading a class session. The groups decide on the theme or topic for the class and the format for the session, and advise the instructor of the selection two or three days prior to the class session. All members are required to participate equally in selecting the topic, and in preparing and presenting it. Then the group is expected to assess the pros and cons of their experience, as well as any changes deemed necessary. This format is used very successfully at Indiana University.
(<http://www.indiana.edu/~iubnurse/r200paper.html>).

And yet another format is present when using groups for the Case Method. This is the primary form of instruction at Harvard Business School, as well as many other higher learning institutions. Here groups of 4-6 students are responsible for analyzing and discussing actual situations managers face in real organizations, from the viewpoint of the general manager. Then the group members offer several solutions to the particular situation being analyzed, and recommend the course of action they consider best, based on the objectives of the company.
(www.hbs.edu/mba/program/)

What Affects Group Interaction And Learning

Lets now examine factors that affect group interaction and learning. One factor to consider here is the **Friendliness Level**. Those groups that display a high level of congeniality, camaraderie, and willingness to help each other, set a very positive atmosphere and facilitate task accomplishment. The result of this friendly environment is more effective performance and a stronger learning process. (University of Phoenix, 1991).

Another factor is the **Intensity Level**. When students work in a group they tend to concentrate more, stay more focused, and display a high level of inner activity. This, in turn, improves the level of performance and enhances interaction among the members. (University of Phoenix, 1991).

Guidelines for Using Study Groups Effectively in Teaching and Learning

A third factor is the **Amount of Activity**. Members of groups that generate several tasks and are actively involved in their performance, are animated, ask questions, debate issues and work together to complete the task in a timely manner and with a high level of quality. The agendas of the group members influence the amount of activity. Some members may want to compete, others may want to work alone to either achieve their own, or the groups goals, and some may want to work together. Of course the most successful groups are those where members want to work together and cooperate with each other to increase the performance quality. (University of Phoenix, 1991).

Instructors need to be aware of these factors, their effect on the groups performance and level of satisfaction, and ensure the students understand them and make them work to their best advantage.

What Affects Group Productivity

Instructors and students need to be aware of processes that affect group productivity. Not all groups work well or efficiently. Some students don't believe others in the group will perform up to their standards, so they decide to do all the work themselves and discourage others from becoming involved. Other students are "no-shows" throughout the duration of the project, and no one knows how to contact them. (The Teaching Professor, 1994).

Some students have good ideas and don't hesitate to offer them and to force their solutions on the group. They don't listen very well to

others' ideas and constantly push everyone in their direction, whether they agree or not. And then, there are those students who attend all meetings and come well prepared, but are so quiet that others forget they are there. (The Teaching Professor, 1994).

How can instructors deal with these unwelcome group member characteristics? One way is to ask small groups of students to discuss them and come up with strategies for dealing with them. The answers will, then, be shared with all the groups as tools to use for corrective action when faced with any of these unwanted behaviors.

Dynamics of Study Groups

It is vital that Instructors set the tone for the study group process at the beginning of the class. As quickly as possible establish a supportive atmosphere conducive to creating mutual trust and encouraging positive feedback. As part of this, instructors should uncover learners hidden agendas inconsistent with the goals of the groups. Not doing this might result in conflict and friction, which will be detrimental to the learning process.

One way to uncover hidden agendas is to ensure learners understand clearly the group responsibilities and tasks, and recognize and address individual needs. Otherwise the group might not be able to achieve the desired performance.

Guidelines for Using Study Groups Effectively in Teaching and Learning

Another group dynamics factor to keep in mind is learners contribution. What happens when some members fail to complete their part of the project on time or worse even, do not accept their share of the work? Should the instructor step in and enforce the rules, or let the group handle the situation? Here the group should decide on the course of action--either carry the non-contributors share or have a confrontation. The best method is for the group to approach the non-contributor, make him or her aware of how this kind of performance is affecting the group, and ask for corrective action.

If all this fails, empower the group to ☐fire the individual, explaining first the reasons for this decision. What is the instructors role when this happens? In the first place, act as a sounding board for the group; then, if the student requests the assistance of the instructor, help him or her join another group, explaining that study group assignments are a requirement to stay in the program.

Should all members contribute equally? This would be the ideal situation, but is not always the case. Depending upon their background and experience, some group members may provide more input than others. The problem arises when one member continues to contribute less than the others, in which case the group should find out the reasons for this. It could be that the members abilities are below those of the other members, which would require the groups encouragement and assistance. The result of this is a stronger group and a better product.

How about groups with a leader versus groups without a leader? There are pros and cons to both. For a group to be leaderless, group members need to contribute equally and feel comfortable with the goals established. They also need to set these goals and the priorities of the group right away, and agree upon the different tasks to accomplish them. Usually it takes time for members to trust one another and realize the benefits to be derived from keeping harmony and understanding each members strengths and weaknesses.

On the other hand, when there is uncertainty as to the direction of the group, this can create anxiety. In this case a group leader is needed. This will reduce fears and create a more familiar social order, but the group creativity and the performance will also be reduced. A good idea here is to rotate the leadership role. Another option is to share leadership. In this case one member would act as the task master, setting the agenda, initiating much of the work activity, and ensuring that the group would meet the established deadlines. Another member could take the leadership role of maintaining effective interpersonal relationships in the group. This is a characteristic of a mature group.

Group Social Benefits Through Task And Maintenance Functions

There are two sets of social benefits available to group members: (1) emotional and psychological closeness to other group members (psychological intimacy); and (2) closeness achieved through tasks and activities (integrated

Guidelines for Using Study Groups Effectively in Teaching and Learning

involvement). (Nelson & Quick, *Organizational Behavior*, 1997).

Groups perform both task and maintenance functions to help members achieve psychological intimacy and integrated involvement. Task functions are more important at the beginning of the groups life as the group members establish roles and determine objectives and procedures. They decrease in importance as the group matures. Using them effectively creates a successful team; not using them may result in disaster.

Maintenance functions foster psychological intimacy, which includes a sense of togetherness, willingness to cooperate, and to be a true team member. They also contribute to the success of the group project, and help reduce the tension created by task functions. Just as task functions, maintenance functions are important for teams to be successful. Figure 2 shows some of the maintenance and task functions observed in successful group.

Rules of The Group

Each group needs to establish rules and clearly identify individual roles and responsibilities at the beginning of each project. The benefit of this is a decrease in anxiety and in the possibility that an assertive group member may take over the group. The faculty member can help the group establish performance standards to enhance the process.

The group should also agree on an agenda and set their project calendar right away. This will allow the members to set their long-range personal planning around the schedule of

meetings of the group, and will give everyone a clear vision of the tasks and deadlines at hand. Groups also need to ensure all members understand that participation is required of everyone within the group in order to achieve the level of performance desired.

Group cohesiveness is another important factor. Encourage members to perform internal group evaluations from time to time, preferably at the completion of each task, to determine lessons learned and how the process can be improved. Figure 3 is an example of how this internal group evaluation could be performed.

Several factors influence group cohesion, among them time to complete the project, size of the group, and internal and external competition. Group cohesion is not something that happens all of a sudden, it evolves over time as the group develops normally. As a general rule small groups, between 4-6 members, are usually more cohesive than larger ones, and this is one of the reasons why study groups should be kept small in size.

The Role of The Instructor

It is a good idea for instructors to remember that their role is that of facilitator, and to avoid interfering in the dynamics of the group.

The instructors main responsibilities are to establish a positive tone, to monitor groups performance, and to guide the process of the group. The positive tone must be established during the first class meeting and continue to be reinforced throughout the duration of the project.

Guidelines for Using Study Groups Effectively in Teaching and Learning

I use the following technique as one of the ways to establish this positive tone. Since the majority of the students I teach, especially in Masters level courses, are military officers of different ranks, I always ensure they understand that once students enter my classroom they are all on the same level. To accomplish this, I use first names with everyone and strongly encourage them to do the same. I have found this reduces the intimidation non-officers feel in competing with their higher-ups during the course. Many non-officers have thanked me profusely at the completion of the course, for the opportunity I afforded them to shine in front of their superiors by reducing their intimidation and anxiety level. This technique also reduces the demands placed on officers to be the authority figure, and everyone seems to relax and have a good time.

Another example of this equality policy in action is when it comes to all other students, regardless of their color, gender, nationality, or station in life, whether housewives, medical doctors, business owners, executives, or the like.

I ensure everyone understands that, once they enter my classroom, they are all at the same level.

Instructors must also monitor group performance, by providing clear direction on tasks and expected performance rather than dictating activities to be performed by the group.

It is important that the group understand clearly the goals and expectations.

It is important for the instructor to track the group process. This will help the groups ensure their schedule is realistic, will keep their performance from becoming sidetracked, and will

contribute to the positive accomplishment of group tasks. One way to track the group process is to use the form depicted in Figure 4. Instructors should ask the groups to prepare this form after each group meeting and give it to the instructor at the class meeting following their group session. Doing this helps the groups stay focused and gives the instructor a status of their activities.

When it comes to guiding the selection process, instructors should limit their involvement to establishing the size of the groups and the criteria for their formation, discussed earlier. Group members may decide to move from one group to another, but the instructor should not participate in this decision. One technique I have found useful here is to have the groups fill out the form in Figure 5, immediately after the groups are first formed. Then I provide copies of the form to each member for easy reference in communicating with group members or other groups, outside of class.

In the event new members are added to the class, it is up to the groups to decide where the newcomers will be placed, provided the size of the groups does not exceed six students. If it does, the instructor should direct that a new group be formed.

Some groups tend to divide the tasks on the first group meeting, and this all right, as long as they continue to meet weekly and have each member be involved in the group process through give-and-take. This is the basis for the learning experience of the study group. The problem arises when

Guidelines for Using Study Groups Effectively in Teaching and Learning

there is Asplintering, that is, the different members work alone on their respective tasks and only meet again when putting the final report together. The instructor should definitely discourage this group behavior by strongly emphasizing the importance of having the project flow together through group meetings, to build strategies and decide on solutions as a unit.

One idea here is to allow time at the end of each class meeting for the different groups to meet in the classroom. It is a good idea for the instructor to stay and listen in on the different group discussions, to get a status of the progress of the groups.

Assigning Group Grades

One of the considerations when assigning grades to the group projects is deciding what is a fair grade for each member of the group. Did they all contribute equally? Did some contribute more than others? Did some contribute less? One technique I have found very useful here is to assign a portion of the group grade based on individual performance. To determine this individual performance I ask members to fill out the form in Figure 6, on an individual basis. I assure them this is a confidential evaluation of their groups, in other words, for my eyes only.

The next item the instructor needs to consider is how to assign the remainder portion of the grade to the entire group. One thing to keep in mind is that assigning a single grade to the group aids in motivating the students to work towards a single purpose and to help each other accomplish it.

Since they will all be getting the same grade, this

is an incentive for the group to ensure that non-contributors participate, and that everyone's efforts to increase the level of performance are intensified. It also motivates the members who are stronger in a particular area to work with those whose strength is not the same. (University of Phoenix, 1992).

One word of caution is in order here. Sometimes placing too much importance on the grade assigned to the group will result in poor performers receiving a high final grade for the project, when the overall performance of the group they were in was outstanding. To add some fairness to the process, I usually assign 20% of the overall course grade to the group project, with 5% of that based on individual performance. I also ask them to include an Appendix to the written document, indicating the part that each group member was responsible for, and the level of contribution.

There are several guidelines instructors can use in evaluating and grading the written report. One I have found very useful is the form in Figure 7, adapted from one used by the faculty of the University of Phoenix. I always share these criteria with the students prior to the assignment, and include the completed form with the graded report I return to them.

The next step is grading the oral presentation of the project. I always require each group to present a summary of their project orally, and insist on the participation of all members of the group. Each group has 20 minutes to make their presentation, or an average of five minutes per member. The oral presentation is worth 5% of the total course grade. This portion of the group

Guidelines for Using Study Groups Effectively in Teaching and Learning

study project seems to stimulate and energize everyone and build some healthy competition. Groups seem to want to outdo each other with their very creative presentations. For the oral presentation I ask each group to evaluate the presenters together, using the form in Figure 8. The evaluations are then handed to each presenting group at the end of their presentation, for their own edification. (University of Phoenix, 1992).

Advantages of Group Work

Not all students are in favor of group work. Some of them are, in fact, more comfortable working or studying alone. Some students are "loners", perhaps very shy, or have had an unsatisfactory experience in a previous group. Others may not like the pressure to conform or to fit in. (Howard Community College, 1996). Yet others may be impatient with the amount of time it takes the group to make a decision and think they can do it faster as an individual. Instructors need to be aware of these and other personality traits and emphasize the many benefits to be gained from the group experience.

One of the positive outcomes of the study group process is strengthening the students' ability to make decisions in the work place. By being exposed to, for example, the dynamics of analyzing and solving case problems as a group, students learn how the process works and the difference between reaching a conclusion as an individual versus reaching it as a group.

Participation in a study group also increases the students' self-confidence in dealing with problems

in the real world, for their role as a member of a group does not only include the classroom but also their workplace, their families, their friends, their religious affiliations, the organizations they belong to, to name a few.

Gaining confidence working with groups reduces the level of anxiety and uncertainty this task may create, as students understand the group dynamics.

Since the deadlines imposed by the group and the amount of work involved is similar to situations students encounter in the workplace, this also prepares them to perform more effectively there, even under pressure.

Students increase their knowledge and experience as each one responds to the different contributions of the other members of the study group. Students also benefit from the many problem-solving techniques and creative solutions that emerge from this group interaction.

Another benefit to be gained is the increased capacity for self-understanding and self-assessment, as the group process heightens their sensitivity to their own behavioral characteristics as well as those of the other members. This helps them to learn not only to be leaders but also followers.

By working with others in the accomplishment of the task at hand, students learn to use their strengths and minimize their weaknesses. This increases their quality and performance level in the present project as well as other projects they may be assigned in the different courses they take.

Their understanding and learning of the material in these courses also increases and becomes more meaningful, as members are involved in the interaction of asking questions, providing answers, sharing their knowledge with others, and getting explanations on material they may not understand. This, in turn, improves their personal and interpersonal methods of communicating, their analytical skills, and helps them become aware of differences in desired and undesired behavior.

methods accordingly?

Conclusion

In an effort to assist instructors to meet the challenge of preparing students to face the world of the 21st Century, we have compiled important guidelines on the effective use of study groups in teaching and learning. We have discussed factors instructors need to keep in mind when creating groups, development stages of groups, suggested formats for effective group work, and touched on how group interaction, learning and productivity are affected. We have covered some dynamics of study groups, the social benefits groups derive from task and maintenance functions, and offered rules for effective group interaction. And, finally, we have discussed the role the instructor plays, offered suggestions to assign group grades, and touched on advantages of the study group process.

It is a reality that the 21st Century is upon us and we are called upon to do what no other generation of educators had to do. Are we, as instructors, prepared to meet the profound challenges and responsibilities of our profession? Are we willing to transform our thinking and our educational

*Guidelines for Using Study Groups Effectively in
Teaching and Learning*

References

The Case Method (1998) MBA Curriculum, Harvard College. [On-line] www.hbs.edu/mba/program/.

2. Nelson, D. L., & Quick, J. C. (1997) Organizational Behavior, Foundations, Realities, and Challenges. (2nd ed.) St. Paul, MN: West Publishing Company.

Advantages and Disadvantages of Group Work (1996) Howard Community College. [On-line] Path unknown.

Group Discussion Assignment (1996) Indiana University. [On-line] www.indiana.edu/~iubnurse/r200paper.html.

The Teaching Professor (October 1995) Volume 9, Number 8.

The Teaching Professor (May 1994) Volume 8, Number 5.

7. Grading/Evaluation/Feedback Manual (1992). University of Phoenix.

Study Group Training Manual (1991). University of Phoenix.

*Guidelines for Using Study Groups Effectively in
Teaching and Learning*

BIOGRAPHY

Ms. Dolly A. Secrist is currently an Instructor of Aviation Business Administration for Embry-Riddle Aeronautical University at their MCLB Barstow, Fort Irwin, and Edwards Air Force Base Centers in California; and a Business and Management Instructor for Park College at their MCLB Barstow, and Fort Irwin Centers, also in California. In addition, Ms. Secrist is a Management Consultant for C&E Engineering and Construction, Inc., in Anaheim, California.

Formerly she was employed at Northrop Grumman Corporation for ten years, where she performed duties as Technology Repair Center Manager and Integrated Logistics Support Engineer Senior for the B-2 Program. Prior to that she was employed at Bechtel Power Corporation for ten years, where she was actively involved in the Procurement aspect of nuclear power plants.

Ms. Secrist holds a Master of Science degree in Business Organizational Management, and a Bachelor of Science degree in Business Administration, both from the University of La Verne, La Verne, California. Ms. Secrist also holds a Systems Engineering Certificate from the California Institute of Technology Industrial Relations Center, and is working on her Doctor of Public Administration degree.

Ms. Secrist is a Senior Member of the Society of Logistics Engineers (SOLE) where she has been very active at the Chapter (Chairman), District, national and international levels. Ms. Secrist is also a member of the California Writers Club, the High Desert Cultural Arts Foundation, and the American Association of University Women.

*Guidelines for Using Study Groups Effectively in
Teaching and Learning*

<u>PERSONAL</u>	
Date _____	Course Number _____
Course Title _____	
Name _____	Telephone (optional) _____
<u>EMPLOYMENT</u>	
Employer _____	Telephone (optional) _____
Job Title _____	
How long in that profession? _____	
<u>EDUCATION</u>	
Academic Ranking (undergraduate, graduate)? _____	
How far into the degree program? _____	
<u>GENERAL</u>	
Why are you taking this course? _____	
How do you hope to use what you learn in this course? _____	
What on-the-job experience have you had relating to this subject? _____	
How do you learn best (small groups, lectures, independent study)? _____	
Discuss briefly your background? _____	
Any hobbies? _____	
Any pet peeves? _____	
If you were an animal, what animal would you be and why? _____	
Any other interesting traits? _____	

Figure 1 - Student Profile Questionnaire

*Guidelines for Using Study Groups Effectively in
Teaching and Learning*

TASK FUNCTIONS	MAINTENANCE FUNCTIONS
Initiating activities Seeking information Giving information Elaborating concepts Coordinating activities Summarizing ideas Testing ideas Evaluating effectiveness Diagnosing problems	Supporting others Following others leads Gate keeping communication Setting standards Expressing member feelings Testing group decisions Testing consensus Harmonizing conflict Reducing tension

*Figure 2 - Task and Maintenance Functions in Groups
SOURCE: Table 4-3, Page 265, Nelson & Quick, Organizational Behavior, 1997*

Guidelines for Using Study Groups Effectively in Teaching and Learning

INTERNAL GROUP EVALUATION

Answer each of the following questions in relationship to this group by circling the number next to the alternative that most reflects your feelings:

1. Do you feel that you are really a part of your group?
5---Really a part of the group.
4---Included in most ways.
3---Included in some ways, but not in others.
2---Do not feel I really belong.
1---Do not work with any one group of people.
2. If you had a chance to do the same activities in another group, how would you feel about moving?
1---Would want very much to move.
2---Would rather move than stay where I am.
3---Would make no difference to me.
4---Would rather stay where I am than move.
5---Would want very much to stay where I am.
3. How does your group compare with other groups that you are familiar with on each of the following points?
The way people get along together.
5---Better than most.
3---About the same as most.
1---Not as good as most.
The way people stick together.
5---Better than most.
3---About the same as most.
1---Not as good as most.
The way people help one another on the project.
5---Better than most.
3---About the same as most.
1---Not as good as most.

Add up your circled responses. If you have a number of 20 or above, you view your group as highly cohesive. If you have a number between 10 and 19, you view your group's cohesion as average. If you have a number of 7 or less, you view your group as very low in cohesion.

SOURCE: Adapted from Challenge 9.1, Page 260, *Organizational Behavior*, Nelson & Quick, Second Edition, 1997.

Figure 3 - Internal Group Evaluation

Form

Guidelines for Using Study Groups Effectively in Teaching and Learning

Group Name _____ Course Number _____	Date _____ Instructor _____
Each group is required to prepare this form after each weekly group meeting. This will help the group stay focused, and will indicate to the instructor how the group is progressing. 1. Purpose of this weeks meeting: _____ Planning the entire project (task identification, determination of deadlines) _____ Organizing the group (task assignments, determination of responsibilities) _____ Deciding which project to pursue _____ Task feedback and individual reports _____ Final report development 2. Number of members in your group _____ 3. Number of members in attendance _____ 4. How much teamwork and cooperation were present? (Circle the appropriate number, with 1 being the lowest and 5 the highest): 1 2 3 4 5 5. What was the balance of the involvement in the group process from individual members? (Circle one, with 1 being the lowest and 5 the highest): 1 2 3 4 5	

Figure 4 - Weekly Meeting Status Report of Study Groups

Guidelines for Using Study Groups Effectively in Teaching and Learning

<i>Group Name</i>	<i>Names of Members</i>	<i>Telephone Number</i>

Figure 5 - Composition of Groups

Guidelines for Using Study Groups Effectively in Teaching and Learning

Group Name _____	Date _____
Course Number _____	Instructor _____

Fill in the names of each member of your study group, including your own name. Then circle the appropriate number from one to five to rate each member's contribution to the assigned project, with one being "No contribution, and 5 being "Outstanding contribution"

_____ 1 2 3 4 5	_____ 1 2 3 4 5
_____ 1 2 3 4 5	_____ 1 2 3 4 5
_____ 1 2 3 4 5	_____ 1 2 3 4 5

Your next step is to objectively evaluate the performance of the entire group, based on the following questions. Again, circle one number from one to five, with one being "Not at all effective and 5 being "Very effective."

Were the members of the group effective in:

1. Helping accomplish the groups goals by making individual contributions?	1 2 3 4 5
2. Maintaining an atmosphere conducive to members contributions?	1 2 3 4 5
3. Keeping focused on crucial issues during the discussions of the group?	1 2 3 4 5
4. Looking for different points of view or compromises in the group?	1 2 3 4 5
5. Dealing with conflicts and resolving them in the group?	1 2 3 4 5
6. Contributing to the written outcomes of the group?	1 2 3 4 5
7. Contributing to the oral presentation of the group?	1 2 3 4 5

Any suggestions as to changes you would like to see made in future groups?

Figure 6 - Individual and Group Evaluation

Figure 1. Schematic representation of the experimental design. The subjects were divided into two groups: the control group and the experimental group. The control group received a standard diet, while the experimental group received a diet supplemented with 10% of the total energy from omega-3 fatty acids. The subjects were divided into two subgroups: the control group and the experimental group. The control group received a standard diet, while the experimental group received a diet supplemented with 10% of the total energy from omega-3 fatty acids. The subjects were divided into two subgroups: the control group and the experimental group. The control group received a standard diet, while the experimental group received a diet supplemented with 10% of the total energy from omega-3 fatty acids.

Group _____	Overall Grade _____
CRITERIA	COMMENTS
Appropriateness 5 6 7 8 9 10 (Meets objectives of assignment)	
Theory 5 6 7 8 9 10 (Incorporates learned theory into assignment)	
Organization 5 6 7 8 9 10 (Logical sequence of arguments and/or subject matter)	
Understanding 5 6 7 8 9 10 (Demonstrates understanding of learned theory)	
Critical Thinking 5 6 7 8 9 10 (Discussion and conclusions based on objective analysis of issue)	
Writing Skills 5 6 7 8 9 10 (Spelling, grammar, punctuation, language skills)	
Structure 5 6 7 8 9 10 (Paragraph/sentence construction, use of headings)	
Format 5 6 7 8 9 10 (Readability, general appearance)	
Additional Comments	

Figure 7 - Evaluation and Grading of Written Assignment

Guidelines for Using Study Groups Effectively in Teaching and Learning

Group Name _____ Course # _____ Date _____		
Criteria to be used for grading: 1 (Below Average); 2 (Average); 3 (Good); 4 (Excellent)		
Category	Grade	Comments
Physical Appearance		
Posture		
Use of Visuals		
Eye Contact		
Easy to Understand		
Use of Time		
Content Quality		
Handling of Questions		
General Comments		

Figure 8 - Evaluation of Groups Oral Presentation

College Level Teaching Effectiveness

Dr. Mark S Bellnap

Embry-Riddle Aeronautical University

Abstract

This is a paper that discusses factors which contribute toward college level teaching effectiveness. Clarity of presentation, meeting student needs, ability to arouse interest and enthusiasm, and respect for student ideas all can contribute to teaching effectiveness. In addition, automation has made significant contributions toward effective teaching.

College Level Teaching Effectiveness

The purpose of writing this paper is to discuss some of the factors that contribute to effectiveness in teaching at the college level. This topic has been widely written about and discussed for many hundreds of years. There is certainly good reason for this. At the heart of the college experience rests the ability of the faculty to provide "expert knowledge in some special direction" (Whitehead, 1957, p 1). If the college fails in this, then it is to some degree ineffective.

It therefore becomes a major focus of the college to determine those factors which significantly contribute to effectiveness in the classroom. Some of these factors are inherent qualities of the faculty themselves. The college must either hire faculty that has those qualities or else provide some type of training to the faculty to develop or enhance those qualities. Other factors that contribute to classroom effectiveness are external to the faculty members themselves. This includes such things as facilities (Sinclair and Skerman, 1984), lighting, technology, and libraries.

The remainder of this paper will focus on two relevant discussion points. Both of those discussion points highlight aspects which contribute to teaching effectiveness. This paper then concludes with a summary which wraps up the salient points.

The first discussion point will be on the variety of factors inherent in the faculty that contribute to teaching effectiveness. The second discussion point will be on automation and teaching effectiveness. The impact of technology

and information cannot be underestimated. There has been more new information in the past 30 years than the previous 5,000 years; there is more information on a weekday edition of the New York Times than the average person in the 16th century would have received in a life time; and the amount of information available doubles approximately every five years (Guns, 1996, p. 3).

Faculty and Teaching Effectiveness Clarity of Presentation and Organization of Subject Matter

Many people have seen the Disney movie "The Absent-Minded Professor." In this movie, Fred MacMurray portrays a warmhearted, yet forgetful college professor. According to Heilbroner (1992), Adam Smith, the classical economist and professor, may have had some of these absent-minded characteristics. One account has the absent-minded Adam Smith walking fifteen miles in his dressing gown before he realized it. Some people today may still stereotype college professors in this light. Generally speaking, this stereotype is not accurate (Miller, 1979).

Regardless of these affectionate portrayals, absent-mindedness and forgetfulness are not good qualities of college faculty.

To the contrary, well-organized materials and articulate classroom presentations are key ingredients in conveying information. Planning the classroom instruction is one way to keep everything organized. The value of planning is not limited to the classroom. Businesses have business plans and many organizations have strategic plans

(Goodstein, Nolan, and Pfeiffer, 1992). These plans help keep businesses and organizations focused.

In the classroom, one way to organize the instruction is with a lesson plan. A lesson plan identifies what you want to teach, will help you from going astray, and it helps insure that all of the relevant material is covered (Stone, 1995). A well-designed classroom presentation is generally very favorably accepted by the students.

How an instructor verbalizes his ideas, thoughts, and meaning plays a big role in conveying the subject to the students. That is, saying things well is important. At his second inaugural ceremony, Abraham Lincoln said "With malice toward none, with charity for all, with firmness in the right as God gives us to see the right, let us strive on to finish the work we are in, to bind up the nation's wounds. To care for him who shall have borne the battle and for his widow and his orphan, to do all which may achieve and cherish a just and lasting peace among ourselves and with all nations." (82nd Congress, 1952, p118). These are well chosen and spoken words, that eloquently express one man's perspective of how the victorious north should pursue peace after the American Civil War. In the classroom, without such clarity, meanings can be misunderstood or misinterpreted. For the student, that can result in faulty analysis of subjects or the incorrect application of a skill.

Meeting the Student Needs

This generally takes two forms. The first is meeting student needs outside the classroom. In today's environment, college classrooms are filled with working adults as well as traditional students. Acknowledging that students

have competing interests for their time (e.g., school, work, and family) is important for faculty to gain and retain the respect of students.

Faculty should not be strict authoritarians and make no allowances when students miss classes and/or request to make up examinations. Students are more likely to develop a good rapport with educational institutions and faculty who are reasonable and flexible.

The second form of meeting students needs takes place within the classroom. An example of this would be to match the teaching method with the needs of the student. Teaching methods would include such things as lecture, classroom discussion, and classroom participation. None of these methods is the panacea for all classroom situations. Rather, each has value in specific settings.

Using the lecture method in an introductory class would seem to be in order. The reason is because it is expected that many of the students would have limited or no background in the subject. A lecture class could provide the "nuts and bolts" of the discipline or subject to the students. This type of information is usually necessary before meaningful and esoteric discussions of the discipline or subject can take place.

The discussion method can be effective in both the upper level undergraduate courses as well as graduate courses. At these levels, the students will generally have some formal educational background in the discipline.

The students should be able to synthesize information and make informed judgments about the subject.

The participation method can be effective at any level. Generally, it

involves the students being involved in some classroom exercise or activity which results in some teaching point. For this to be effective, both the activity or exercise and the teaching point must be geared to the level of the students involved.

The dilemma for the faculty is that using a teaching method which seems appropriate for the educational maturity level of the students will not necessarily be effective for each student (Halpern, 1997). For teaching to be effective at the individual level, it needs to be patterned to that individual (Jacob, 1957). For example, some students may feel an aversion to participation in the classroom or discussion in the classroom. For those students neither classroom participation nor discussion would be an effective teaching tool.

Ability to Arouse Interest and Enthusiasm

In 1970, I attended my first hockey game. While the game was action packed and fast paced, what I really remember the most was the fan involvement. The fans were riveted to the game. They took in all of the sights and sounds that were taking place on the ice rink. The fans cheered loudly when the home team performed well and booed with equal energy when the opposing team did something well. The sheer overwhelming fan involvement left a very strong impression on me.

This type of intensity and enthusiasm can have a very positive effect in the education environment. Jim Rohn, America's foremost business philosopher, (1994, p. 36) said that "communication is the ability to affect other people with words." It is probably every instructor's desire to generate both

enthusiasm and energy in the classroom. Students who possess that enthusiasm will be striving to solve the various problems identified and discussed in the classroom. It is unimportant if those problems are of a nature such as assessing the solvency of a company after looking at their financial statements or understanding the economic ramifications of a trade deficit on a multinational firm.

For the instructor whose instruction technique can spark the flame of interest, a high level of enthusiasm is attainable.

One way for the instructor to generate enthusiasm is to be enthusiastic about the material. Enthusiasm is contagious and will serve as a catalyst. Another way is to make the subject challenging for students. It needs to be challenging in way consistent with their confidence and competence (Guns, 1996).

Tolerance, Empathy, and Respect for Students and Their Ideas

The prospects for learning in the classroom are greatly enhanced when there is a mutual respect between the instructor and the students. Crosby (1996) has stated the relationships are based on a climate of consideration and achievement that people recognize as genuine.

Recently I was told a story about a teacher and a student on the playground.

The student was in fourth grade and approached the teacher who was the playground monitor. The student looked sad and explained that one of the older boys had taken his lucky rock away. The teacher's first inclination was to tell the boy to get another rock to play with. The desert is full of them. What the teacher ended up doing was have the boy go back to the playground and ask for his lucky rock from the boy who had taken it

away from him. Approximately thirty minutes later the teacher saw the same boy with a big smile on his face. He was walking through the playground throwing a small rock in the air and catching it. The teacher approached the boy and asked if he got his lucky rock back. The boy said yes.

The teacher asked the boy why the rock was so lucky. The boy said that his father was really mean and for a long time he had wished that his mother would leave his father. One day this boy found a rock and told it that he wished his mother would leave his father. The next day the mother left the father and the boy and his mother returned to the town where he had been born.

Needles to say, the teacher was grateful that she told the boy to go back to the playground and get his lucky rock.

It is not always easy to determine the significance of things or events to others.

Sometimes, when instructors impose their own assessment and values on a situation, others can suffer as a result. When people are asked rather than told, this creates an atmosphere for learning (Watkins and Marsick, 1993). Each student, brings to the classroom their own values, knowledge, and experiences.

In an open classroom environment, the instructor and students are able to share values, knowledge, and experience, and everyone benefits from the exchange.

Automation and Teaching Effectiveness

Automation is just one of many things that have contributed to the quality of education in the classroom. However, automation will not automatically result in better teaching. How automation is used is the key (Meltzer and Sherman, 1997). Hundreds of years ago

classrooms were without central heating, light was provided by candles, students did not have calculators, and facilities lacked the acoustics that we see today. Advances and modernization in all of these areas have contributed to teaching effectiveness.

Automation, per se, is not the end product in the classroom. Rather, automation, like proper lighting and central heating can contribute to effective teaching in the classroom. However, managerial actions and not faculty are often the dominate factors in determining the outcomes of computer use (Kraemer et al, 1989, p. 5). Two of the major influences of automation are the ability to process information very quickly and the second is the accuracy of the product.

In the 1930s and 40s business automation was often used in financial applications. Salaries, overtime, vacation time, deductions, and allotments, could all be easily computed with automation. The errors in programming were corrected, and accuracy increased correspondingly. Advances in automation allowed for such applications as linear programming and cost benefit analysis. Automation has allowed for the accurate calculation of very complex mathematical models to be performed in a short period of time.

The number of automation applications in the classroom setting is numerous. For example, in MAS 605, Research Methods and Statistics, statistical software such as Minitab can be used in the classroom. This software can perform the mathematical computation necessary in wide range of statistical tests (e.g. Chi Square, Kruskal Wallis, and the Mann Whitney U).

In addition to the actual mathematical computations, the instructor will often

have specific teaching points to demonstrate to the class. For example, consider the effect of outlier data. With the use of automation and by changing the input data, the instructor could show the effect of outlier data on such things as the mean and standard deviation. Without the automation, the instructor would have to do the computations manually. Manual computations can consume a large amount of time. In addition, there is a greater likelihood of making mathematical errors when computations are performed manually.

BA 518, Managerial Finance, provides another example of the use of automation in the classroom. Spreadsheets can be developed to compute a company's net income based on such variables as sale, bad debts, cost of goods manufactured, taxes, and interest. By changing any of these variables, the spreadsheet can quickly re-compute the new net income.

BA 511, Operations Research, provides yet another example. Software packages can model complex network projects such as the Critical Path Methods (CPM) and Program Evaluation and Review Techniques (PERT). Simulation, inventory models, and exponential smoothing can all be performed by automation (Long, 1989). Automation can be an effective tool to use in classroom instruction. It aids the instructor in presenting material and aids the student in understanding material.

Summary

The purpose of this was to discuss some factors that contribute to effectiveness in college education. Three of these factors dealt with qualities of the instructor. These factors include clarity of presentation and organization of subject matter; the ability to arouse

interest and enthusiasm; and tolerance, empathy, and respect for students and their ideas. The fourth factor under consideration was the use of automation in the classroom. All of these factors, under the right conditions, can promote teaching effectiveness in the college classroom.

References

- Crosby, Philip. (1996). The Absolutes of Leadership. San Diego, CA: Pfeiffer and Company.
- Goodstein, L. D., Nolan, T. M., & Pfeiffer, J. W. (1992). Applied Strategic Planning. San Diego, CA: Pfeiffer and Company.
- Halpern, Diane F. (1996). Student Needs "Reality Check." The Education Digest, 63 (1), 24-26.
- Heilbroner, Robert L. (1992). The Worldly Philosophers. New York, NY: Touchstone Press.
- Jacob, Philip E. (1957). Changing Values in College. New York, NY: Harper and Brothers Publishers.
- Kraemer, K. L., King, J. L., Dunkle, D. E. & Lane, J. P. (1989). Managing Information Systems. San Francisco, CA: Jossey-Bass publishers.
- Long, Larry. (1989). Management Information Systems. Englewood Cliffs, NJ: Prentice-Hall Incorporated.
- Meltzer, J., & Sherman, T. M. (1997). 10 Commandments to Implement Technology. The Education Digest, 63 (1), 59.
- Miller, Richard I. (1979). The Assessment of College performance. San Francisco, CA: Jossey-Bass Publishers.
- Rohn, Jim. (1994). The Treasury of Quotes. Irving, TX: Jim Rohn International.
- Sinclair, C., & Skerman, R. (1984). Management Development at a Public Service Board. In Malcom S. Knowles, & Associates (Eds.), Andragogy in Action (pp. 87-97). San Francisco, CA: Jossey-Bass Publishers.
- Stone, Florence M. (1995). The High-Value Manager. New York, NY: AMACOM.
- Watkins, K. E., & Marsick, V. J. (1993). Sculpting the Learning Organization. San Francisco, CA: Jossey-Bass Publishers.
- Whitehead, Alfred N. (1957). The Aims of Education. New York, NY: The Free Press. (Original work published 1929)
- 82nd Congress. 2D Session. House Document Number 540. (August 1, 1952). Inaugural Addresses of the Presidents of the United States.

**CHALLENGES IN THE MODERN COLLEGE CLASSROOM:
BALANCING
PSYCHOLOGICAL NEEDS AND ACADEMIC RIGOR**

Dr. Kathleen L. Ringenbach

ABSTRACT

Teachers face many challenges in the modern classroom. The typical student in adjunct academic programs is no longer between the ages of 18 and 21. This paper will discuss the challenges that instructors face, as well as different teaching methods that can be used to address some of the problems and challenges.

**CHALLENGES IN THE MODERN
COLLEGE CLASSROOM:
BALANCING PSYCHOLOGICAL
NEEDS AND ACADEMIC RIGOR**

Many adjunct academic programs are now catering to a new breed of students. The typical student is no longer the 18 to 21 year old, supported by his or her parents. Many of the students are adults, with careers and families. Coming back to school is a challenge, and often a necessity because of job requirements. Many of the challenges for teachers often discussed in the adjunct campus arenas are related to technological issues, how we need more computers and library services. Little attention is paid to psychological issues related to the students and how teachers can better serve their students' needs. Every classroom is filled with students who are struggling with some issue or problem beyond the academic domain. It is a real challenge for teachers to discover the issues and deal with them effectively so that learning and growth can take place. This paper will discuss some of these issues faced by students and challenges presented to teachers.

**CHALLENGE 1: THE
OVERACHIEVER**

Most teachers would say, "I'd give my eye teeth for a class of overachievers." And indeed, overachievers are usually attentive, enthusiastic, and want to excel. They put

110% into their work. However, overachievers can come with their own set of problems. Many overachievers have problems in dealing with their own imperfections. They think because they put so much time into projects, tests, and papers, that they should receive 100% on everything. Anything else is regarded as a failure. The overachiever may even suffer from low self-esteem. I had a student who became distraught after receiving a 95% on a midterm examination. Instead of laughing at her for being such a perfectionist and dismissing her disappointment as silliness, I sat down and talked about her expectations for herself. We talked about the idea that perfectionism does not exist and that there is always room for learning and growth. The student walked away with a better understanding of herself. She was still an overachiever, but her self-esteem did not suffer as greatly from minor mistakes.

CHALLENGE: **Help the overachiever to realize his or her own potential, and faults. Help the overachiever to deal with disappointments.**

Another problem that can exist for a teacher is that the class may perceive the overachiever as the teacher's pet. When a class discussion takes place, the teacher often falls back on the overachiever when no one else can answer the question. While this may make some students feel good, many overachievers feel embarrassed and

singled out. They don't want to be the center of attention. In one of my classes, I had a student who obviously spent many more hours on his assignments than his fellow classmates. It could have been very easy to direct all questions to him, because he knew all the answers. The problem with this would have been that no other students would have had to think. The overachiever could come up with the answers for everyone. In one class, I was asking students to think about different research methods. One student made a comment that I should just ask the overachiever and the rest of the class wouldn't have to think so hard.

If I had done that, none of the rest of the class would have learned about research design.

Another technique that I use quite often is group projects. I spread the overachievers out, so that one is assigned to a group. I also ensure that the overachiever does not do all the work for the group, by having the group write down the responsibilities of each group member. The overachiever helps to bring up the entire level of the group and the other group members learn more. In many ways the overachievers become peer tutors without them being singled out by the teacher.

CHALLENGE: Try to bring the class to a higher level by forcing them to rely on their own brains and not just on the overachiever. It may take more time, but the learning will be that much richer.

CHALLENGE 2: UNDER-BELIEVER

The under-believer can fall into two different categories: THE QUIET MOUSE and THE CLOWN. Both have a common variable, low self-esteem or low confidence. The quiet mouse tends to sit in the back of the room and tries to hide. This individual may have had difficulty in high school or may have learning disabilities. It has been my experience to have at least one student with learning disabilities in each class, even small classes of five or less. The quiet mouse is often ashamed of his or her problems, and often times the problems don't appear until the first test.

I had one student run out of my class in tears after getting her test back. I called her on the phone the next day and talked to her about her reaction to her grade. After a few minutes, she admitted to having learning disabilities that were not discovered until she was a junior in high school. She felt ashamed and dumb, and did not feel it was my problem. I told her that her learning was my job. We had to work together in order to find the best ways that she could learn. We agreed that she could take future tests after class so that I could read the questions to her. She felt she understood things a lot more when she heard them orally versus just visually. She did much better on the other exams.

CHALLENGE: Be aware that many returning students have experienced some type of academic failure. Be aware of the students who sit meekly, do not talk, and are having difficulty early on in the class. Act as a partner in the learning process.

The class clown is also a challenge. Many clowns hide their fears and insecurities behind humor. The clowns often try to pull the class off the track. When the material becomes difficult, the clown often jumps in and starts to make jokes. The clown's goal is to keep away from academic challenges. I had one student who would start to joke as soon as I started talking about homework from the previous week. He also would put himself down, making light of his abilities to write. As a result, I have made it a rule in my class that no one can put anyone down, including one's self. It is amazing how many individuals do not even realize they are putting down their abilities, even if it is through a joke.

CHALLENGE: Help students to make positive statements about themselves and to avoid putting themselves down, even in jest.

One of the biggest difficulties, after the clown takes over, is getting the class back on track. There is nothing wrong with laughing along with the students. In fact, it helps make the teacher seem more human. After the

class dies down from laughter, I shift the direction back to the task immediately and have another student start to talk. Sometimes redirecting with humor is very effective. The key is to get another student talking. Because the clown lacks confidence, the clown is often sensitive to other students and their feelings. The clown often is not willing to interrupt another student in the learning process. The clown then can be included slowly in the serious discussion.

CHALLENGE: Keep the clown from taking over the class, without killing the clown's initiative and motivation to learn.

CHALLENGE 3: KNOW IT ALL

The Know It All falls into two categories: THE CLASS HOG and the BELLIGERENT STUDENT. The Class Hog stands out very quickly. This is the student who takes over a class discussion and will not relinquish the floor to other students. I had a student who would start to talk and jump from topic to topic. He rarely took a breath, so it was very difficult to interrupt him to get the class back on track. During the break in the second class meeting, several students came up to me and asked if I couldn't get him to, "Shut up." After another long afternoon, I decided that I was going to have to come up with a method for sharing. I decided to use a debate format in which each student was only allotted one minute to share his or her point of view. This also forced the

class hog to better organize what he wanted to say. He had a terrible time at first and was very agitated at not being able to get his point across. After several class meetings, he began to be more organized in his presentation of the material.

When a debate format is not possible, it is essential to cut the individual off, without hurting his or her feelings. Gently interrupt and make a comment about some positive aspect of the hog's statement and how the statement fits into the topic being discussed. Then guide the discussion back to the topic.

CHALLENGE: Keep the class hog from taking over, without making the hog feel like his or her opinion does not matter.

The belligerent student is truly a challenge. This student often does not want to be in the class and lets the faculty member know right away what he or she thinks. I had a student tell me, "This theory stuff is just a bunch of crap. I can't wait until I can take applied classes. For the time being, I guess I just have to waste my time." I told the student that I was going to prove her wrong, and that she might actually learn something. Another endearing attribute of the belligerent student is to make the faculty member look stupid by questioning the teacher's credentials and by constantly picking at what the teacher says.

I had one student tell me that she had decided not to pursue a career in her major of psychology, but was too close to her degree. She was extremely unmotivated and hostile about some of the material. She had done an internship and felt the theory classes were not applicable to the real world and that being a clinical psychologist was a lousy profession after all. I asked her what she wanted to do when she finished her degree and she said that she wanted to go into business. We worked it out so that she could integrate what she really wanted to do with the class subject. I allowed her to do her term paper on something of interest in the area of business, as long as it could be tied to the class in some way. This immediately increased her motivation and decreased her belligerent attitude. This also demonstrated to her that theory could be applied in a variety of career fields.

CHALLENGE: Do not take what the belligerent student says personally. Address each concern with calm and clarity. Find out what is behind the hostility.

CHALLENGE 4: WHINER

Many whiners feel overwhelmed. They are trying to juggle a career, family, and school. They may not even really want to be at school, but may feel pressed to get a degree in order to move forward in their careers. When they first look at the syllabus, they start

complaining about the level of work. After each assignment, they complain about how it took too much time. When they get back their grade, it is never exactly what they think they should get given their highly stressful lives.

These students often have a reason or excuse for not doing as well as they would have liked. It is rarely their fault. I had a student who was not happy with her final grade. She blamed my poor teaching, her boss, her co-workers, her job, and the Director of the Academic Center. No where in her recital of why she received the poor grade did she take responsibility for her own actions and grade outcome. I try to let students know up front how much time a project could take. This helps them to organize and plan ahead.

On the other hand, sometimes the students have legitimate complaints. It is unfair to expect students to do complicated mathematical equations if the teacher is behind schedule and has not covered the material. I have revised due dates on assignments if the time line seems unfair. For example, I have given extra time on final papers so that students would have a chance to incorporate any feedback I had previously given.

CHALLENGE: Be sympathetic with students without compromising ethics or making the class so easy that a four year old could pass.

CHALLENGE 5: GRADE MONGER

There are two categories of grade mongers: NON-THINKER and YOU OWE ME. The non-thinker is very difficult to deal with, because the student's goal is the product and not the process of learning. One of the things that contributes to this attitude is that companies will only reimburse the cost of the class if the student receives an AA@ or a AB.@ I had one student who was constantly asking for reassurance that she was on an AA@ track. She was also very competitive and would question me if she thought other students did not deserve an AA.@ She even stated at the beginning of the class that she did not care if she learned anything; she just did not want to blow her grade point average. She also wanted her money reimbursed from her company.

I use a total point format. Each assignment is worth a certain amount of points. The point totals for each assignment and how the assignment will be graded are on the syllabus. For example, I have set criteria and points associated with each for class presentations. The students know that the presentation will be graded on flow, coverage of topic, grammar, eye contact, use of aids, signs of nervousness, etc. The total points and the grades associated with those points are also listed on my syllabus. If the maximum class points total to 500, the students know that they have to get 450 points

(90% or higher) in order to receive an AA.@ I tell students that they can keep track of their own progress by taking the total and subtract any points lost on exams, papers, etc.

CHALLENGE: Make sure students know that what grade they receive is their responsibility. Be very clear about the grading policy on the syllabus.

The main attribute of most grade mongers is that they do not want to think. They want to be spoon fed. They want to know exactly what will be on the tests. I hand out study guides the week before the test to help students direct their study patterns. Yet, I still get students who feel that I should have handed out the study guide two weeks ahead of time. These students also have difficulty writing papers that require thought or application of other materials.

They do very well when all they have to do is summarize other people's work. Having to think or apply knowledge often angers these students and they feel bewildered by the requirement to apply knowledge. I had one student tell me to tell him exactly what to write and he would. He did not care if he did not agree with it; he would do whatever it took to get the good grade. I told him that I would not tell him what to do, that he would have to think about it and come up with his own solution. He was incredibly frustrated and called me multiple times a day to ask questions.

Many times, I would answer his question with a question. This was much more time consuming for me, but he learned more. At the end of the course, he actually he told that he had learned something, in spite of himself.

CHALLENGE: Get the grade monger to focus on learning and not on the grade. Get the students to realize that learning is an essential part of obtaining good grades.

The last type of grade monger is the most discouraging. These students feel that we owe them a good grade just for attending every class. I had a student tell me that he deserved an AA.@ because he attended every class. It did not matter that he got a AC@ on both his midterm and final. I had another student tell me that it was my responsibility to tell her if she was that close to a AC@ so that she could have studied harder for her final. When I refused to change her final grade, she threatened the Director that she would drop out of the program and take her money elsewhere. Luckily the Director backed my point of view.

There are many institutions that have become grade factories to appease students who think they deserve good grades, just because they have paid a large amount of tuition. However, when these students graduate, they have little knowledge or usable skills. It is the teacher's duty to prepare students for the "real world" with marketable knowledge,

skills, and abilities. We are not doing the students any favors by handing out good grades for minimal work. We are also not doing the institution any favors as well. The institution's reputation rests on the quality of the students who graduate.

CHALLENGE: Let students know that grades have to be earned and are not given away. A quality program is not a grade factory.

The teacher-student interaction is the backbone of any academic program. The challenge is to balance academic rigor and the needs of the students. An effective teacher is not only a technological guru in his or her subject domain, but now must be an amateur psychologist as well.

Colleagues in Community:

Faculty Building Collaborative Environments

Wendy L. Gans, Ph.D.

Embry-Riddle Aeronautical University

Arizona State University

Abstract

Colleagues in Community describes faculty building collaborative environments. It emphasizes faculty collaborative interaction for sharing teaching and learning experiences as a community. The framework for this sharing encompasses our lives as faculty -- the work, students, and organizational systems in which we find ourselves. This framework is slowly shifting from an instruction-based relationship to a new paradigm of faculty and students as members of a learning community. Many faculty within the Embry-Riddle Extended Campus (EC) community have begun to make this shift. Some excellent examples are presented of EC faculty efforts toward community development.

Colleagues in Community
Colleagues in Community describes faculty building collaborative environments. It emphasizes faculty collaborative interaction for sharing teaching and learning experiences as a community. The framework for this sharing encompasses our lives as faculty -- the work, students, and organizational systems in which we find ourselves. This framework is slowly shifting from an instruction-based relationship to a new paradigm of faculty and students as members of a learning community. Many faculty have begun to make this shift, and examples are presented of their efforts toward community development.

Community Paradigm

What Pat Hutchings (1996) called "Making Teaching Community Property" and Parker Palmer (1998) has referred to as "Learning in Community: The Conversation of Colleagues," I call *Colleagues in Community*. My assumption is that such communities are different from the way college faculty currently operate. In theory, these cooperative communities are part of a migration in which faculty view themselves, their teaching, and their organizations as moving from the old "Instruction Paradigm" to the new "Learning Paradigm" (Barr & Tagg, 1995).

In the old paradigm, "educational institutions are full of divisive structures" (Palmer, 1998, p. 36). Faculty members teach classes, conduct research, advise students, sit on university committees, and perform community service. In the institutional world of teaching, research, and

service, "the three are rarely assigned equal merit. Research and publication dominate" (Johnson, Johnson, & Smith, 1991, p. 1:4). In the world of promotion, tenure, and long-term recognition, there is little motivation for professors to increase teaching skills and performance. "We believe that the academic community will have to reconsider some of its priorities if faculty are going to be willing to commit time and energy to instructional improvement programs. That said, we are heartened to find there are ways to enhance the likelihood of faculty participation in such programs" (Keig & Waggoner, 1994, p. 133).

Faculty do participate and interact with one another by sharing research experiences with colleagues in the department or research center, by presenting at conferences and workshops, and by publishing findings for others to share and emulate. For the most part, faculty enjoy their work; 68% of full-time instructional faculty and staff were satisfied with their workload (Kirshstein, Matheson, Jing, & Pelavin, 1997). Within the collegiate environment, the rewards of faculty work go to the individual, although the institution and unit also benefit from the success.

The current organizational system emphasizes the individual, and this is especially true for classroom teaching. Instruction given in isolation is reinforced by the teaching/learning and department/program structures in which most universities operate and "that rarely communicate with one another" (Barr & Tagg, 1995, p. 19). Isolation helps to keep

faculty sheltered in their own classrooms, not venturing into the domain of others. This system is referred to as the Instruction Paradigm, with one teacher per classroom and defined class times/sessions. "In the Instruction Paradigm, a college aims to transfer or deliver knowledge from faculty to students; it offers courses and degree programs and seeks to maintain a high quality of instruction within them, mostly by assuring that faculty stay current in their fields..." (Barr & Tagg, 1995, p. 15).

Further, the focus on the individual fosters the behavior that "in the classroom, we close the door on our colleagues... we claim it as a virtue called *academic freedom*" (Palmer, 1998, p. 142). Individualism under the guise of academic freedom serves to isolate learning. Individual faculty members may not be comfortable consulting their peers for ways to improve teaching because it suggests inability as well as vulnerability. It may be difficult for faculty who view themselves as experts to admit the need for and actually to ask for help with teaching.

"The view that those who know can teach is part of a paradigm of teaching that is labeled as the 'old' paradigm" (Johnson et al., 1991, p. 1:4). College faculty often begin their teaching careers with little formal knowledge of how to operate in the classroom. Much of their education may have focused on learning content knowledge and developing research skills. Any techniques on how to teach likely developed from prior experience and an appointment as a graduate teaching assistant. Formal instruction in teaching at the college-level

may or may not have been provided. This has resulted in a cadre of faculty who teach the same way they have been taught -- by lecture, preparing research assignments, and evaluation through end-of-course objective testing.

Seldom do faculty share classroom concerns beyond the exchange of anecdotes or concerns with problem students. What is needed is a sharing of teaching and learning experiences to make classrooms true learning laboratories (Cross, 1990). Sharing opens up the learning opportunities and emphasizes the shift from classroom-centered to student-centered learning that "requires a constant search for new structures and methods that work better for student learning and success..." (Barr & Tagg, 1995, p. 20). The goal is more than to place new methods into old structures, but also to define new structures based upon desired student outcomes, standards, and assessments.

These new structures develop learning organizations for students and faculty. The goal is to build community that makes a broader range of learning available to all. The faculty workload of teaching, community service, and advancing knowledge through research implies gathering and disseminating of knowledge -- a broad sharing of learning in community. Already, through cooperative structures and collaborative leadership, community building is becoming part of the current organizational mix.

Students in Community

There is a growing literature on cooperative/collaborative learning efforts.

These strategies are based on the activities of students and faculty incorporating group or team exercises in their classrooms (Millis & Cottell, 1998; Foyle, 1995; Johnson et al., 1991). The students are the ones doing the cooperating/collaborating, rather than the faculty. For faculty to encourage and structure student collaboration is one beginning step toward the community emphasis of the new paradigm. The new paradigm of teaching is to help students construct their knowledge in an active way while working cooperatively with classmates so that students' talents and competencies are developed" (Johnson et al., 1991, p. 1:12). Students have opportunities to become active participants engaged in their learning as compared to passive listeners of a lecture.

This trend in teaching using collaborative techniques helps to incorporate a larger variety of active learning methods so that students have opportunities to apply those skills needed both in their careers and for good citizenship. In the classroom, teamwork is being encouraged and practiced as a means for students to learn cooperative skills they will use on-the-job in committees, task teams, project teams, TQM groups, and general problem-solving activities.

Additional skill development activities involve the use of practical, hands-on, and critical thinking exercises such as case analysis, critical thinking and analytical exercises, writing, and presentations. There have been many efforts at across-the-curriculum development of skill sets by establishing overarching objectives for student learning and outcomes. Research

over the past twenty years has demonstrated the relationships between effective problem-solving and a variety of academic domains (Dougherty & Fantaske, 1996).

A specific example of enhanced skills that faculty are teaching to students can be seen in the movement toward the increased use of technology in the classroom in all forms. The fear has been that technology will replace faculty. Faculty using more technology find that it furnishes additional teaching techniques (PowerPoint, CD-ROM, etc.), provides avenues for reaching students who have different learning styles, develops new skill sets, and allows for practice and application in many areas in addition to computer usage. The technology is contributing to a wider range of options in how students receive and process information. What faculty are noticing is that they are changing from the role of information provider to the role of information facilitator. The Learning Paradigm suggests that a "faculty member is an inter-actor -- a coach interacting with a team... that of designing and then playing a team game... faculty create new and better 'games,' ones that generate more and better learning" (Barr & Tagg, 1994, p. 24).

Faculty in Community

In their classrooms, faculty are now incorporating active learning, applied skills, and an emphasis on collaborative projects. It is ironic, however, that faculty more often teach the team concept than practice it. The current nature and structure of teaching make it a one-to-many activity, and few venture outside that model. Indeed, there

are few structured opportunities for sharing pedagogical and classroom resources in a viable manner that allow faculty to utilize these options on an ongoing basis. If collaboration is viewed as a good technique for students, should not faculty serve as role models for that technique? If a desired outcome is increasing student participation and learning, does it follow that increased learning and satisfaction could also be derived for faculty if faculty were to collaborate in their teaching?

There are many efforts in which faculty collaboration takes place: research and scholarly activities, curriculum and program design, and academic committees. In these instances, faculty expect participation as part of their personal and professional contributions and satisfaction. Hutchings believes that "like scholarly research, our courses are acts of intellectual invention, and our teaching of those courses enacts the ways we think about and pursue our fields of study" (Hutchings, 1996, p. 1). Thus teaching is seen as part of the essence of all faculty work, that teaching and research are part of the same continuum. This continuum -- stretching toward a new paradigm, holds that teaching is scholarly work with "the need for collegial exchange and publicness... [and] that faculty take professional responsibility for the quality of their work as teachers" (Hutchings, 1996, p. 2).

Palmer believes that faculty collaboration on teaching does not occur because "we rarely talk with each other about teaching at any depth -- and why

should we when we have nothing more than 'tips, tricks, and techniques' to discuss" (Palmer, 1998, p. 11). Palmer discusses the need for faculty to be personally involved with their teaching and establishing "connections among themselves, their subjects, and their students" (Palmer, 1998, p. 11). As part of a responsible learning community, Palmer believes that "involvement in a community of pedagogical discourse is more than a voluntary option for individuals who seek support and opportunities for growth. It is a professional obligation that educational institutions should expect of those who teach..." (Palmer, 1998, p. 144). In setting that expectation, faculty and academic institutions move toward a new paradigm of colleagues in collaborative communities.

It is probably not possible to change or revamp overnight the current "old" paradigm into the learning paradigm of *Colleagues in Community*. The one-instructor-to-a-classroom structure remains the norm in most college and university settings. However, if "teaching is a scholarly activity, with all that implies, then faculty must play a central role in ensuring and improving its quality" (Hutchings, 1996, p. 3).

Faculty are taking on this important role of improving teaching through the use of collaborative student and faculty approaches, and making their efforts part of community and scholarly knowledge. Davis (1995) explores many options and presents illustrations for interdisciplinary courses and team teaching. Hutchings (1996) documents

the AAHE Teaching Initiative that encompasses twelve university projects and provides model programs for peer collaboration and peer review. Masterson discusses learning communities of linking two or more courses around a theme, but most importantly, of linking faculty and students in a new way to run a university (Masterson, 1998, pp. 8-9). These activities encourage the transformation to a community-centered environment.

Acting in community encompasses inclusiveness of people as well as collaboration on processes. It extrapolates restructuring and reengineering the collegiate environment into a community of learning and cooperation, where people and processes develop around the sharing of experiences. Partnerships develop without structures, and structures support communities of scholars. Through sharing, all have a larger stake in the outcomes of the whole as well as those of the individual. The whole is larger than the sum of its parts. Community learning enhances the learning of each -- and of all.

Learning in Community

Within the Embry-Riddle Extended Campus (EC) community, excellent examples of faculty collaboration already exist. The goal is to make these efforts community knowledge, to share them and thereby learn from them, to add to them, and to come together to improve teaching and the quality of student learning. Many of these examples may be similar to experiences of faculty at other universities. But the

nature of the Extended Campus, with over 100 teaching sites, poses a unique challenge to bringing faculty into the community fold.

Embry-Riddle's Extended Campus stretches across the United States and into Europe. There are faculty in each region and center who are on full-time contract, but most faculty serve in an adjunct role. This geographically diverse, part-time nature of the faculty is not unique in higher education, and it poses some difficulties in developing a community environment for those adjuncts in the various centers. (The two residential campuses of Embry-Riddle, one in the southeast and the other in the southwest, pose additional challenges to faculty collaboration.) The development of common Course Outlines, the Faculty Academic Orientation Manual (Wheeler, 1996), and other cross-campus and center teaching aids have provided assurances that faculty follow the same guidelines in their classrooms.

The bigger challenge is building a sense of community. Currently, students often sit in classrooms isolated far from their peers. Likewise, faculty have few opportunities to share their triumphs and tragedies. Promoting the community vision and taking steps to make it a reality build the organization into a collaborative environment that can better provide learning opportunities for faculty and students. This vision incorporates, but also goes beyond, the concept of a multi-modal seamless university. It goes beyond the extension of Distance Learning (DLX) and listserv communications. It offers the benefit of being included in a community of learning

for students and faculty that is the ultimate goal and outcome. There is often the necessity for faculty and administrators to concern themselves with the bureaucratic "how to" of implementing new learning techniques and structures. However, if faculty take the lead and begin the journey to collaborative and community ways of operating, the administrators and structures then must accommodate these actions, and thus the community grows.

To have this community of Embry-Riddle colleagues enhances the opportunities for Extended Campus students and faculty. Faculty and students benefit from the active, participatory learning of others including cooperative/collaborative methods. There are many ways to enhance teaching, from sharing instructional resources to collaborative performance with other faculty.

Such efforts can be between two instructors, merely sharing or cooperating on a small project, even if the emphasis in each class is different; this could set up a cooperative and/or competitive environment for the students, making the outcome dependent on additional factors.

In a simple instance, team teaching could occur with two similar classes, where faculty share one lesson plan during the same term. When it comes to developing a computer-based lesson plan, the preparation time can often be greater than for that of lecture. If a software simulation package is being used, the entire package must be tested in order to know the options and learning that will take place. Lessons need to be developed and taught: surfing/searching the

net, finding relevant information and downloading it, developing presentations, using e-mail and web pages, creating spreadsheets and charts, etc. In a case where one faculty member is already familiar with a program or exercise, sharing it with another faculty member and another class enhances the learning of all.

The Airline simulation (Smith & Golden, 1994), as recently used, presents a case in point. This simulation is appropriate for several undergraduate or graduate level courses, as it looks at many aspects of running an airline with different areas that can be emphasized. In the graduate business policy class, there was a focus on developing a corresponding strategic plan to guide the financial decisions of the game; the simulation was also used simultaneously in the undergraduate airline management class with more emphasis on the game decisions. It could easily work for classes with planning, management, or financial agendas, to suggest a few.

The sharing of the Airline simulation between the two classes took place in the following manner. One of the two professors had used this simulation before, and attended a session of the other class to provide explanatory background material on operating the simulation. Teams were developed in each of the two classes and these competed within that class. In addition, just past the mid-point of the term, each class had its own all-class briefing session at which time the students re-developed the scenario and financial statements beginning with the first period.

These two class-developed airline scenarios were then compared in a friendly competition! The students gained valuable knowledge and insights from the briefing sessions, information which they then re-used to complete their own team's operation. Both classes gained expertise from the briefings, and further developed their competitiveness and their spirit of camaraderie.

A shared experience using technology is also the case with ShareVision (and the new SIDE version), whereby one instructor can teach at two or more sites simultaneously. This technology allows for both audio and visual two-way communication. It is an excellent example of putting students into a larger learning community, but faculty need to broaden the faculty outreach use of this method. In this and other ways, technology opens doors and sends previously unavailable experts directly into the classroom, developing shared lesson plans across sites for the same class.

For two instructors to share an assignment does not require them to be teaching similar courses; often the emphasis is skill development based upon prior knowledge. The sequencing of classes from one term to another term promotes subject and application building and can be included into patterns of class exercises. Faculty could better coordinate the shared "requirements" for level of skill development -- computing, critical thinking, writing -- and express that growth in these areas will be expected across the curriculum. The EC Faculty Senate adoption of common skill

objectives for students promotes this concept (Clark, 1997), as does the Computing Across The Curriculum initiative (Clark, 1993).

A good example of sharing an assignment occurred recently between an undergraduate calculus class and a graduate meteorology class. The meteorology class researched an on-line source graphic that depicted the temperature changes that served as the thermal generator for El Niño weather patterns. The calculus students, divided into four groups, used various methods to compute area, accuracy of scale, and latitude/longitude to provide potential energy computations. The benefits were a perceived collaboration among students in both classes, use of real-world material across subjects and levels of study, and the spirited and informative groups efforts that occurred. (M. Warner, personal communication, May 2, 1998). Two classes were able to share resources which added to the knowledge and expertise of both.

Since many instructional and learning aids are borrowed or developed, the sharing of these resources can provide benefits to a greater number of faculty and students. A wide range of exercises, case studies, videos, and articles that are used by instructors present valuable opportunities for cooperative activities. Collaboration might be between two faculty, or involve a group of faculty in a department or college-wide collaboration across disciplines and regional EC centers. Such efforts could be for an entire course or several courses, a sequence of courses, or an interdisciplinary approach

to a core of courses required of many programs. Indeed, "in the Learning Paradigm... interdisciplinary (or nondisciplinary) task groups and design teams become a major operating mode" (Barr & Tagg, 1995, p. 24).

Students benefit from collaborative learning in the classroom, so why not also use students as resources to be shared among classes? A planned cooperative effort could take place between classes whereby other students become an audience for presentations. Students could also serve as references, complete surveys, or provide classroom/project information to other students.

Another source of classroom expertise is to bring in a guest speaker to broaden everyone's knowledge and put the theory into a real-world focus. Excellent sources of guest speakers are (1) to use other faculty as experts, and (2) to call upon other faculty for a reference of a speaker on a specific topic. Indeed, it should also be possible to have more than one class of students share in a guest presentation; a small amount of coordination on the part of two or more faculty members can develop such a combined presentation. Speakers who present talks on-campus could also be seen live at EC center classrooms through the use of distance technologies. The sharing of experts and expertise is as expandable as our minds can envision.

Journey to Community

We can begin this journey to learning communities by using the expertise of all of us who are faculty to expand from an

instruction paradigm to a learning community. In this transformation, each of us must seek ways to be inclusive of faculty and students. We can connect the themes of teaching and technique because "as we learn more about who we are, we can learn techniques that reveal rather than conceal the personhood from which good teaching comes" (Palmer, 1998, p. 24).

When we open our teaching to the community, it makes the possibilities greater for us all. Faculty meetings can be shared time in which we discuss new ideas for involving ourselves in active learning cooperative arrangements. At the last faculty meeting for our local EC centers, we began the task of developing a list of individual expertise, interests, and e-mails to be shared among the group. Colleagues need to know each other and what they are about in order to begin the collaborative process. Sharing knowledge and personhood begins the dialogue.

The cooperative movement among faculty has begun, at Embry-Riddle and elsewhere. We discuss the positive outcomes of faculty who have learned to connect intellect, research, learning methods, and the "heart" to learning in community with students and other faculty. We see the actions of colleagues who are already taking steps and working in community with each other. For every small community that develops, individuals stretch the system to a new dimension. Stretching the ways we think and act about teaching, learning, and being a community hastens the journey to the paradigm of *Colleagues in Community*.

References

- Barr, R.B. & Tagg, J. (1995, November/December). From teaching to learning: A new paradigm for undergraduate education. Change, 27 (6), 12-25.
- Clark, R. (1993, October). Computing across the curriculum. Report of the Curriculum Task Force of the College of Continuing Education, Embry-Riddle Aeronautical University, Daytona Beach, FL.
- Clark, R. (1997, May). Student performance objectives. Motion of the Extended Campus Faculty Senate, Embry-Riddle Aeronautical University, Daytona Beach, FL.
- Cross, P. (1990, December). Teachers as scholars. AAHE Bulletin, 43 (4), 3-5.
- Davis, J.R. (1995). Interdisciplinary courses and team teaching: New arrangements for learning. Phoenix: American Council on Education/Oryx Press.
- Dougherty, B.C. & Fantaske, P. (1996, winter). Defining expectations for problem-solving skills. In E.A. Jones (Ed.), New directions for higher education. No. 96. Preparing competent college graduates: Setting new and higher expectations for student learning (pp. 55-66). San Francisco: Jossey-Bass.
- Foyle, H.C. (1995). Interactive learning in the higher education classroom: Cooperative, collaborative, and active learning strategies. Washington, D.C.: National Education Association.
- Hutchings, P. (1996). Making teaching community property: A menu for peer collaboration and peer review. Washington, D.C.: AAHE Teaching Initiative: American Association for Higher Education.
- Johnson, D.W., Johnson, R.T., & Smith, K.A. (1991). Active learning: Cooperation in the college classroom. Edina, MN: Interaction Book Company.
- Keig, L. & Waggoner, M.D. (1994). Collaborative peer review: The role of faculty in improving college teaching. ASHE-ERIC Higher Education Report, 1994, no. 2. Washington, D.C.: Graduate School of Education and Human Development, George Washington University.
- Kirshstein, R.J., Matheson, N., Jing, Z., & Pelavin Research Institute. (1997, July).

Instructional faculty and staff in higher education institutions: Fall 1987 and fall 1992.
Washington, D.C.: National Center for Education Statistics, U.S. Department of Education.

Masterson, J.T. (1998, April). Learning communities, the wizard, and the holy grail: The power of collaboration in learning. AAHE Bulletin, 50 (8), 8-9.

Millis, B. & Cottell, P.G. (1998). Cooperative learning for higher education faculty. Phoenix: American Council on Education/Oryx Press.

Palmer, P.J. (1998). The courage to teach: Exploring the inner landscape of a teacher=s life. San Francisco: Jossey-Bass.

Smith, J.R., & Golden, P. (1994). Airline: A strategic management simulation (3rd ed.). Englewood Cliffs: Prentice Hall.

Wheeler, S.E. (Ed.). (1996). Faculty Academic Orientation Manual. Daytona Beach: College of Career Education, Embry-Riddle Aeronautical University.

"Wild Ideas" Sessions in Teaching Astronomy Courses

Vladimir S. Airapetian
Embry-Riddle Aeronautical University, Extended Campus, Eastern Region at Andrews
AFB

A Paper Submitted to the Sixth Annual Symposium on Teaching Effectiveness

Abstract

A new technique of teaching astronomy courses for science and non-science majors, so called personalized "wild ideas" sessions, is proposed. The brainstorming approach was developed and applied for teaching astronomy courses at ERAU, Eastern Region over the last 3 years. This technique represents an efficient and fun way to learn basic astronomical concepts and methods through a student's involvement in generating "wild ideas" about a given astronomical fact or set of facts, their analysis and verification. Basic elements of the technique and one sample session are described.

I. Introduction.

In teaching physics and astronomy courses for non-science majors, instructors usually encourage students to become scientifically literate in order to understand and appreciate new developments in science. Nowadays, with the large amount of information coming into the classrooms and textbooks every year it is difficult to navigate students in this ocean of new data and discoveries. The Internet provides easy access to a vast range of astronomical information at all levels and has been incorporated into many astronomy courses (English 1997). An introductory astronomy course often represents an introduction to science in general, and therefore, to the elements of the scientific method. Critical thinking becomes one of the priorities of education. This approach has been implemented by involving students in writing individual and "minute papers", identifying and correcting misconceptions (Deming, 1997). An active learning supplement for an introductory astronomy course developed by McNamara et al. (1997) represents another example of critical thinking skill-building and model-building exercises.

During the last three years I have taught introductory astronomy courses at ERAU-Eastern Region, implementing the critical thinking approach through a "brainstorming" method. I have developed a new technique to teach physics or astronomy through a

student's personal (logical and emotional) experience to learn the basic elements of scientific method. This technique implies an active way of participation in the classroom where the student is personally involved in the process of generation of ideas, their analysis and verification.

Generation of ideas and their verification are two important steps of the creative process in science and can be demonstrated in astronomy or physics courses while discussing possible interpretations of recent scientific discoveries. The data for testing and verification of these ideas often readily available over the Internet. An introductory astronomy course is usually one of the first science courses students take, so it is important to show how the elements of critical thinking and observational data analysis can lead to a scientific hypothesis and theory.

Brainstorming has been introduced by Alex Osborn, an advertising executive who believed that under the "right" circumstances, anyone could enjoy the rewards and pleasures of being creative. De Bono (1992) has argued that mental capacity and creativity can be improved with practice. I find that creativity is enhanced through sessions moderated by an instructor who encourages an emotionally relaxed atmosphere for student involvement in the generation and analysis of ideas. In this paper I develop this approach and propose it as a

new method, the **personalized "wild ideas" technique**, to teach introductory astronomy and science courses. Below I describe the basic elements of this process, followed by some sample problems and an example session.

II. Mechanics of a Brainstorming Technique

Brainstorming is proven to be the most effective with relatively small groups of students (< 30 students per group) and should be performed in a relaxed environment. This implies an instructor to moderate or ignite a brainstorming process and a chalkboard or white-board to write "wild ideas". Whole session lasts approximately 45-60 minutes and can be divided into three main phases: 1) Instructor's brief and concise description of the problem; 2) Shouting out and creating of a bank of "wild ideas"; 3) Verification of ideas. Personalization of the idea generation process is very important stimulus of student involvement. Always give credit to a student for his own ideas

Phase 1: Getting ready for the Session.

One of the most important phases of the method is a preparation to the session. An instructor is expected to refer to a given subject with a description of a problem situation presenting background information about the subject with all important

references (chapters in astronomy textbook) at Web Site one day prior the session.

In the beginning of a class the problem should be formulated and illustrated (!). It is instructive to use recent astronomical data. A number of public informational Web sites contain different kind of data and are currently accessible on the Internet. For example, the official Web site of Space Telescope Science Institute (URL address: <http://oposite.stsci.edu/pubinfo/>) contains latest Hubble Space Telescope data (high-quality images and spectra) and press releases about recent discoveries. The problem situation then can be defined in terms of "why", "what" or "which" key words referring to the real astronomical phenomenon or process. Clarity of a problem formulation is a very important to make brainstorming more efficient. I usually formulate a basic feature of an astronomical object under discussion in a single statement and present a basic information as a list of them (illustrated in Section III). Then after 10-15 minutes I ask student to shout out "wild ideas".

Phase 2: Shouting out "wild ideas"

Each "wild idea" generated by a student should be credited by the name of the author and listed on the board. In order to make Phase 2 successful students should be advised to:

- ☐ Listen carefully to the problem description and background information

introduced by your instructor. Clarify the formulation of the problem and ask yourself as many questions as you can to get the whole picture.

- ☐ Write down the problem and any important details. Keep the description as short as possible
- ☐ Write down two or more keywords describing a given process or phenomenon and try to combine them.
- ☐ Not to worry about style, just make sure you get the gist of the idea.
- ☐ Shout out the idea that can account for at least two features of a problem described by an instructor.
- ☐ No matter how silly or unworkable the idea is, a student must shout it out.
- ☐ Build on ideas of others combining two or more "wild ideas" ("superwild ideas").
- ☐ Not to criticize "wild ideas".
- ☐ Use a hint option provided the instructor who moderates a brainstorming session.

Each idea generated during the Phase 2 should be named by an author and written down on a white- or blackboard. This inspires students to develop previous ideas, combine them or come up with an alternative idea. Depending on the psychological type, students have different attitudes to their own ideas. Some of them often prejudge their ideas negatively. Positive emotional atmosphere moderated by an instructor and an example of other students shouting out ideas encourages everyone

to overcome such an "emotional barrier" and become an equal creative thinker.

Phase 3: Verifying the Solution

Once we collect 6-10 "wild ideas" about the subject, the verification process is moderated by an instructor under the active student participation. Instructor discusses each "wild idea" to satisfy basic features described in Phase I. The crucial factor in selecting the best idea is a number of observational facts or experiments which could be explained consistently. Instructor subsequently throws out "dead ideas". Instructor comes up then with one or two best "wild ideas". The last step is to refer students to the actual source (scientific paper, press release, and book) to show that a final solution of the session is qualitatively consistent with accepted scientific interpretation of a given fact.

III. Problem Situations in Teaching Introductory Astronomy Courses

Below I present a list of problem situations which have been offered during the astronomy courses taught at the Embry-Riddle Aeronautical University, Andrews AFB and Naval Air Station, Patuxent River, MD. The problem formulation is usually supported by the image (or illustration) taken by ground-based or space-born telescopic observations (for example, the Hubble Space Telescope).

- ☐ Why several impact sites were observed

on Jupiter as Shoemaker-Levy comet collided with the planet? (picture taken by HST)

- Why Venusian surface is smoother than Mercurian one? (images provided by Magellan and Mariner satellites)
- How could it happen that the solar atmosphere is hotter than the solar surface? (picture of the solar eclipse)
- What causes the Sun to shine? (image of the Sun from SOHO satellite)
- Why most of the stars on the image of M16 (gaseous pillars) taken by HST are red? (picture of M16 taken by HST)
- Why white dwarfs are located at the cores of planetary nebulae? (picture of Helix nebula taken by HST)
- How to explain the presence of young "blue stragglers" in the center of globular clusters? (make use of the Press Release on HST site)
- How to explain observations of very narrow periodic pulses (with periods 0.3-3 s) coming from the central regions of nebulae? (image of the Crab nebula)
- How to understand a quasar miracle phenomenon, identical twin quasars AC 114 (6 billion light years away) or Einstein Cross phenomenon? (HST image)

IV. Sample Session: What causes the Sun to shine?

Phase 1. Background information.

Recent image of the Sun from SOHO

satellite data should be presented for illustration (available on the SOHO Web site).

a. The Sun is made of the hydrogen (80 %), helium (19 %) and less than 1 percent of metals. The heavy elements amount only for one billions part of its mass.

b. The Sun is a very high-output factory of energy generation. It emits 2×10^{26} W while a regular power plant produces only a few hundred of MW (regular light bulb has a power ~ 100 W).

c. The Sun has formed 4.5 billion years, which is only 1/3 of its expected life.

d. The power of radiation emitted from the Sun is constant with accuracy less than 1 %.

Phase 2. Shouting out "wild ideas":

1. Chemical reactions release energy which eventually heats the Sun (**Jon's wild idea**).

2. Heating the Sun with comets and asteroids falling on it (**Carol's wild idea**).

3. Radioactive decay in the solar core. Something like an atomic bomb? (**Jim's wild idea**).

4. H-bomb in the solar interior or nuclear reactions can power the Sun (**Julie's wild idea**).

5. The collapsing Sun will heat the interior releasing gravitational energy (**Mark's wild idea**).

6. Matter - antimatter interaction can heat the Sun (**Sara's wild idea**).

Phase 3. Verification of □ wild ideas □.

1. The chemical reaction, $2\text{H} + \text{O} = \text{H}_2\text{O}$ (water molecule), has one of the highest outputs.

Only one billionth of the energy spent we could get out from this reaction. That's is not going to keep our Sun shining for a long time, about 10,000 years or so. □ a

defective idea.

2. In this case, the kinetic energy of falling bodies is getting converted to the heat increasing temperature of the plasma, but in order to provide required heating rate we need millions of asteroids falling onto the Sun. The Sun emits 2×10^{33} erg/s. The falling body with the density 3 gr/cm^3 , size is about 10 meters, velocity is about 100 km/s has the kinetic energy only 10 orders of magnitude less than the solar emitting power in 1s. This means that we need to assume 10 billion asteroids or comets falling every second in order to provide the Sun with a required rate of heating. This is not supported by any observations. □ a **very defective idea.**

3. Heavy elements like uranium emit heavy particles (like helium) and transforming into less heavy element like lead. We have discussed that this process for the volcanic activity in the Solar system. This is very inefficient for the Sun because we need unrealistically huge (billions of times) amount of heavy elements to support the heating process. □ a **good looking but defective idea.**

4. Fusion produces energy by fusing together light particles like hydrogen into more massive particles like helium. H-bomb indeed utilizes a similar process to produces an

explosive and very efficient (a few percents) energy release. To start this process two protons should overcome their electric repulsion (us any like charges). To satisfy this condition protons should have high speeds (corresponding to $T \sim 14$ million K). To account for the required energy output we need a lot of them which can be created by the gravity force obviously only in the most densest part of the Sun, the solar core.

- a **good idea.**

5. Nice idea and we can really get enough energy out of this process per unit time converting potential energy of falling plasma into the kinetic energy, but it is not going to last longer than several hundreds of thousands of years. □ a **defective idea.**

6. Practically, 100 percent of the energy can be converted into the heat accounting the Sun shinning for billions of years. Unfortunately, there are problems with this because the number of heavy particles in the Sun must stay the same and very soon the matter-antimatter reaction would violate that rule and nature would not go for it. □ A **defective idea.**

Final selection: Idea #4 is the most promising candidate to solve the problem.

V. Conclusion

The version of a brainstorming session as proposed here is targeted to improve the teaching process for introductory science courses. The implementation of the "wild ideas" technique at ERAU, Eastern Region has shown that:

1. Creativity of students has been increased through the phases of generation, analysis and verification of the "brainstorming" sessions. This is a risk-free opportunity for students to reveal their personal ideas without being criticized. "Right" circumstances created during a session help students to reveal and developed their creative abilities. Students usually become actively involved by the second or third session. I describe student creativity in terms of the number of successful ideas generated by a student during the sessions and in term papers.
2. The "wild ideas" session increases student involvement in seeking the "truth". Class attendance and student performances have been increased compared to the astronomy classes taught by "traditional lecture" approach.
3. The "wild ideas" technique in particular increases student-instructor and student-student interaction. This method has proven to be a good way to convey the basic course material. The intense interaction with each other and the instructor makes the learning experience memorable while teaching constructively

critical thinking. I have observed that students sometimes stay after class hours for informal discussions.

More information about the implementation of the "wild ideas" technique can be found on my personal Web Site

<http://hrssun.gsfc.nasa.gov/~vladimir/vlad.htm>
1

References

- De Bono, E. (1992). *Serious Creativity*, Harper Business.
- Deming, G. I. (1997). *Bulletin of the American Astronomical Society*, 1212.
- English, T. (1997). *Bulletin of the American Astronomical Society*, 1211.
- McNamara, B. J., Burnham, C. C. Bridges, C. W. & French M. G. (1997). *Investigating Astronomy*, Mosby-Year-Book, Inc., MO.

*International Student Self-
Selection into the Introductory
Speech Course: Spring 1995-
Spring 1997*

**International Student Self-Selection Into
The Introductory Speech Course:
Spring 1995 - Spring 1997**

Mark H. Wright
Dept. Humanities & Social Sciences
Embry-Riddle University
600 S. Clyde Morris Blvd.
Daytona Beach, Fl. 32114
(904) 226-6662
(904)- 226-7210 fax
wrightm@cts.db.erau.edu

James Cunningham
Dean of Academics
Embry-Riddle University
600 S. Clyde Morris Blvd.
Daytona Beach, Fl. 32114
(904) 226-6640

Assessing the international student diversity in different instructors' speech classes is important in understanding student perceptions of instructors, and in correcting misperceptions. One-way ANOVA revealed that while time of day was not a significant factor in choosing Speech sections, the instructor was a significant factor. Before the Conference, we will complete a round of surveys that attempts to get detailed impressions of different instructors. Those results will also be included in the paper.

The goal of this study is to determine whether there is evidence for international student self-selection into Embry-Riddle's introductory, general education speech course. This goal is significant in that it can provide individual instructors with insight into what diversity means in their speech classrooms. Combined with further study, this analysis will help reveal how international students choose speech instructors and/or sections.

During the time period studied, that course, HU 219, was specified in the University's general education requirements. Therefore, one would expect that international students would make up the same share of HU 219 students as their share of the student population as a whole. In addition, one might expect that the differences in the distribution of international students by instructor would be significant, both in terms of groups of students (Middle Eastern for example) by instructor, and in terms of the total distribution of different types of students (Middle Eastern, African, etc.) by instructor. Finally, if instructor is a strong factor in section selection, one would expect it to be a stronger factor than the time when sections are offered.

METHOD

Class lists for each HU 219 section offered from Spring 1995 - Spring 1997 were obtained. These lists contain student ID numbers, by which international students may be identified. International student numbers begin with "F." A list of international students was compiled, and the names were forwarded to International Student Services staff, which provided their countries of citizenship. International students were divided into eight groups based on their citizenship: Asian; Middle Eastern; African; Caribbean; Central and South American; Western European; Eastern European; and North American.

The class list also provided the instructor name and the time the class was offered. Hence not only could the number of international students be expressed as a percentage of total students, but it was also possible to compare the variation in representation of different groupings of international students for different instructors.

*International Student Self-
Selection into the Introductory
Speech Course: Spring 1995-
Spring 1997*

The following table compares the representation of international students in each instructor's class as both a percentage of all students and as the number of international students per section.

Instructor	% of Int'l Students	International Students Per Section
NP	17.8	4
AS	12.6	2.1
JC	13.3	2.7
DB	6.1	1.2
AM	19.6	3.4
MW	12.8	2.6
MM	11.9	2.3
BH	9.8	2.25
SF	9	1.9

*International Student Self-
Selection into the Introductory
Speech Course: Spring 1995-
Spring 1997*

The following table compares the representation of international student groups, expressed as a percentage of all the instructor's international students in each instructor's classes.

	Asia	MidEa	Afric	Carib	C/SAm	WEur	EEur	NAm
univ.	31.5	19.5	13.7	8.8	8.2	7.6	6.9	3.8
NP	5	80	0	0	0	10	5	0
AS	30	10	17	0	17	17	0	9
JC	38	0	0	0	25	25	0	12
DB	27	9	0	27	9	22	0	9
AM	29	17	12.5	12.5	4.2	12.5	0	8.3
MW	15	31	0	31	0	23	0	0
MM	12.5	25	6.25	6.25	12.5	25	0	6.25
BH	22	0	11	0	11	33	11	11
SF	29	10	10	20	0	5	24	0

Instructors with fewer than three sections were eliminated from the instructor comparison analyses.

*International Student Self-
Selection into the Introductory
Speech Course: Spring 1995-
Spring 1997*

Finally, the times when different student groups took Speech classes were compared. The class scgedule was broekn into four times. T1 represents first period classes. T2 represents classes from first period through noon on MWF, and through 12:30 on TTh. T3 represents classes from noon through 4:30 MWF, and from 12:45 through 3:50 Tth. T4 represents the last class period of the day. The following table shows how different student groups were distributed across the four time periods.

	Asia	MidEa	Africa	Carrib	C/SAm	WEur	EEur	NAm
T1	9	6	0	0	8	9	0	0
T2	42	40	25	35	30	33	66	38
T3	39	32	33	56	38	36	0	38
T4	12	23	40	7	23	12	33	25

PERCENTAGE OF INTERNATIONAL STUDENTS IN ALL SECTIONS

During the time period studied, the percentage of international students in the university's total undergraduate population averaged 15%. Interestingly, international students made up only 12% of the students in HU 219 during the time period studied. This discepancy may be due to differences in foreign student identification between the admissions office and the registrar, or to international students delaying taking HU 219 until their junior or senior years at a greater rate than students who were U. S. citizens.

To test the second hypothesis, the percentage of upper and lowerclassmen was calculated for both international students and U.S. citizens. The following table summarizes those results:

International		U. S.	
% Upperclass	% Underclass	% Upperclass	% Underclass
88	12	71	29

*International Student Self-
Selection into the Introductory
Speech Course: Spring 1995-
Spring 1997*

Hence it appears that in comparing the percentage of international students in speech sections with their percentage of the total student population, it's necessary to assume a three-year lag, rather than assume they are taking Speech at the end of their freshman or the beginning of their sophomore year.

EVIDENCE OF SELF-SELECTION WITHIN STUDENT GROUPS

Single Factor ANOVA was performed comparing the amount of students from different international groups across different instructors. The amount of students in a group was expressed both as a percentage of all international students in an instructor's sections, and as the number of international students from that group per section for each instructor.

As a Percentage of All International Students for Each Instructor

Source of Variation	SS	df	MS	F	P-Value	F Crit
Between Groups	4091.58	7	584.511	4.36296	.000524	2.15643
Across Groups	8574.18	64	133.972			
Total	12665.8	71				

As The Number of International Students Per Group Per Section

Source of Variation	SS	df	MS	F	P-Value	F-Crit
Between Groups	3.35569	7	.479384	3.24702	.004786	2.14154
Across Groups	10.4823	71	.147638			
Total	13.838	78				

*International Student Self-
Selection into the Introductory
Speech Course: Spring 1995-
Spring 1997*

Finally, single factor ANOVA was performed comparing the distribution of students in each international student group across the four time divisions.

Source of Variati on	SS	df	MS	F	P-Value	F Crit
Between Groups	22.7143	7	3.78571	.008973	.999996	2.57271
Within Groups	8860.25	21	421.917			
Total	8882.96	28				

EVIDENCE OF SELF-SELECTION ACROSS STUDENT GROUPS

Single factor ANOVA was also performed comparing the total distribution of international student groups across instructors.

To reduce measurement error (since the average in all groups using percentages would be 12.5), this analysis was performed using only number of international students of each group per section.

Source of Variati on	SS	df	MS	F	P-Value	F Crit
Between Groups	.721076	9	.08012	.427096	.916217	2.0166
Within Groups	13.1314	70	.187592			
Total	13.8525	79				

DISCUSSION

When student groups were compared against each other across instructor, whether the number of students was measured as a percentage of each instructor's international students, or as the number of students per each international student group per section, the differences were significant. The p-value for the first analysis was .000524; the p-value for the second analysis was .004786.

Further, the differences in distribution of students in each group across the four time periods was not significant. The p-value for that analysis was .999996, so differences in distribution were almost certainly due to chance factors.

When the distribution of international student groups was compared across instructors, the differences were not significant. Perhaps because the shapes of the distributions were similar, it was more difficult to assess variations. Or perhaps an interpretation of the result would be that student origin is stronger than the "pull" of the instructor in determining which section an international student will choose.

CONCLUSIONS

There is some significant evidence that points in the direction of different rates of enrollment in different instructor's classes being due to international student group membership.

Individual instructors may benefit from knowing how the mix of international students in their sections is different from that in other sections.

In order to fully understand whether self-selection occurs, and how it occurs, it will be necessary to survey international students. A mix of prospective and retrospective surveys would minimize measurement error. However, prospective surveying is logistically impossible, since it would have to be conducted during registration. In any case, students should be asked what factors entered into their selections of Speech instructors, which instructors they considered if the instructor was a factor.

In this way we can begin to understand how international students perceive different Speech instructors, and perhaps encourage more diversity in Speech classrooms.

The version of the paper presented at the conference will include the results of one round of surveys, conducted at the beginning of Fall semester, 1998.

Teaching with Technology in the Modern Classroom:
A Learning Systems Model

Dr. Gary R. Schornack
Dr. Charles E. Beck

May 1998

*Teaching with Technology in the Modern Classroom:
A Learning Systems Model*

Abstract

Rapid advances in technology, an expanding non-traditional student body, and paradigm shifts are profoundly changing education. With Federal initiatives targeting ways to help students, educators feel the pressure to do more teaching with technology. However, educators may tend to adapt a piecemeal approach, without recognizing the wider implications for education as a total system. The Learning Systems Model expands and tailors a process model for teaching that identifies the interrelated components of education at the levels of individual, institution, and the wider society. In particular, elements within the model emphasize the needs of a multi-cultural and diverse student body, as well as the implications of utilizing technology as a tool in education. The discussion ends with specific teaching skills and techniques to help the educator adapt to the modern classroom.

**Teaching with Technology in the Modern Classroom
A Learning Systems Model**

Modern educators face numerous challenges. From outside their institutions, educators must answer to constituencies who demand greater accountability for the time, effort, and money spent on the educational process. Internally, educators must adapt to rapidly changing technology, to an expanding non-traditional student body, and to changing paradigms of the educational process. In reacting to pressure from one or other of these dimensions, educators may react too quickly, reaching for a single cure-all as a quick solution. But as a modern proverb has stated, "When you're up to your knees in alligators, it's hard to remember that the original objective was to drain the swamp."

The proverb is now dated, of course, written before the advent of the Environmental Protection Agency and the preservation of wetlands; however, the proverb does remind us to focus on the broader picture.

Among the changes impacting education, technology provides the greatest challenge. The Clinton Administration, especially under the initiative of Vice-president Al Gore, has emphasized the need to adapt technology to education, not only through a focus on connecting schools to the Internet but also by creating an elite Technology Corps to bring technical expertise to students (Baker, 1995). *Change Magazine* sees that technology can serve as

either a means or an excuse for educational change, but it sees that change as developing slowly.

The integration of information technology into teaching and learning is inevitable and well under way, but it will not be sudden.

Although we cannot predict all the changes, we can still influence them. That is our responsibility and challenge (Gilbert, 1995, p. 6-7).

Perhaps change in the modern classroom will come slowly because individuals or institutions are reluctant to change. But in this transition, educators must avoid focusing too narrowly on one aspect of the educational process, especially to new technology, resulting in a piecemeal approach. Rather, educators must approach education as a systems endeavor, which requires them to identify the interrelationship between elements prior to incorporating new technology. Such interrelationships can help answer some pressing questions for the proper integration of technology: What are the teaching skills and pedagogy for the future? "How can schools teach technology better, and who will do that teaching? Also, how can industry and schools work more cooperatively to ensure that graduates are 'workplace literate?'" (Baker, 1995, p. 42)

This paper presents a series of heuristic models that identify the interrelated teaching components of the broader educational process. With this heuristic method, educators can better guide the changes occurring within their own institutional settings. The discussion begins by briefly examining the purpose and limitations associated with models as a means of analysis. Building on the systems' perspective, the Basic Systems Model forms the foundation for subsequent models. Expanding on this Basic Model, a more comprehensive Rhetorical Process Model identifies the broad set of elements that underlies any communication-related activity. This expansion distinguishes the more subjective from the more objective parts of the process.

Since the educational process extends the rhetorical process, developing the categories more completely yields the Educational Process, identifying the interrelated elements that comprise an educational system. Elaborating these teaching elements forms the bulk of our discussion.

Models as Perspectives on Education

Theoretical models help to explain an unknown by providing a schema that helps visualize or conceptualize some given phenomenon. A theoretical model uses the known to parallel the unknown phenomenon that one needs to understand. In more precise terms, according to Hesse, a model

depends on some system of thought epistemologically prior to and independent of the particular phenomena that the model explains (Hesse, 1967). According to Kates, a model must identify the elements, the linkages that connect the elements, and the principles that underlie the elements and linkages. Practitioners can use such models as laboratories for examining the practical import of any changes within the system (Kates, 1971). Even those who distrust theory and models tend to rely on conceptual schemas to organize data: as Richard McKeon summarized, "We are suspicious of systems of being and of knowledge, but we organize and systematize information and raise questions and draw new consequences from schematized data, facts, and relations" (McKeon, 1971, p. 44).

Along with their usefulness, however, models have significant limitations. Models can help the theorist in visualizing the education process only to the extent to which the model's assumptions reflect the applicable process. Inexact models, outdated models, or models based on inappropriate analogies can serve as blinders that prevent users from seeing the total reality. But even with the most precise model, the very construction of the model itself involves a significant drawback:

Since a model is a static replication, a model of a dynamic process is inherently inexact. Any communication model will conceptually violate the transactional

requirement as the model isolates and labels components for the sake of clarification and discussion.

People perceive the models in a static manner, even if the reality reflected by the model is a highly dynamic event. In any communication event, people can simultaneously integrate many discrete activities: perceive, interpret, and respond to multiple aspects of a situation while remaining aware of multiple levels of meaning and implication. A model, however, makes these components discrete. While clarifying the specific elements involved, a focus on discrete elements creates a static perspective at odds with the reality itself. As long as users of the model recall this limitation, the model can serve as a useful tool for studying, understanding, and discussing the communication process related to teaching skills in the classroom.

For a teaching model to be effective in examining educational change, it must be comprehensive, identifying the relevant elements from education as a system. Only then can the model serve as the basis of educational change. According to Michael Holzman (1993), the failure of many attempts at educational reform stem from "the lack of a systematic approach: the failure to include all areas of the system in decentralized behavior" (p. 18). Unfortunately, a comprehensive approach runs the risk of appearing too complicated; furthermore, such a comprehensive approach challenges the quick-fix mentality of

Americans in general and educational bureaucrats in particular: "It's simply easier for educational bureaucrats to grab the latest quick fix and abandon it when the next sure thing comes along" (Kean, 1993, pp. 13-16). But avoiding the instant solution proves especially important when incorporating technology into the modern classroom.

Developing a model for educational change requires building a model on a solid foundation, then incorporating all of the interrelated elements that affect the teaching and educational process. It also must incorporate the dynamics of change within the entire system.

The Education Process Expands a Basic System

To examine education, we can benefit from two interrelated focal points: education is ultimately a communication process; and both communication and education are best seen as systems of interrelated components. As systems, both education and communication involve inputs, specific activities aimed at reaching objectives, outputs of products and services, and feedback to evaluate the process. This underlying process appears as the Basic Systems Model, shown in Figure 1 attached.

The Basic Systems Model provides a starting point, but its categories are very broad. By dividing the model both horizontally and vertically, the Basic Model expands into the Rhetorical Process Model.

The horizontal separation divides inputs into both status and assumptions, integration into purpose and method, and outputs into product and interpretation. The bottom half represent the more objective elements (status, method, and product), while the top half represents the more subjective elements (assumptions, purpose, and interpretation). The vertical division divides each of the central elements: purpose into intentions and audience, and method into genre and process. Figure 2 presents this expanded Rhetorical Process Model.

For communication, the process begins with status and assumptions. Status includes the historical facts about a given communicator, such as background, education, experience, and role for the given communication (educator, student, board member). Assumptions include both conscious and unconscious attitudes that underlie the encounter, including self confidence, attitudes toward others in the communication process, and cultural expectations.

The integration portion of the process, the center of the model, begins at the top with purpose, focusing on both intentions and audience. In any communication encounter, participants begin by determining their purpose: i.e., what they want to achieve (intentions) from a given audience. The purpose can include to gain a willing listener, to ensure understanding, to fulfill legal requirements, or to provide the basis for a long-term relationship. With a

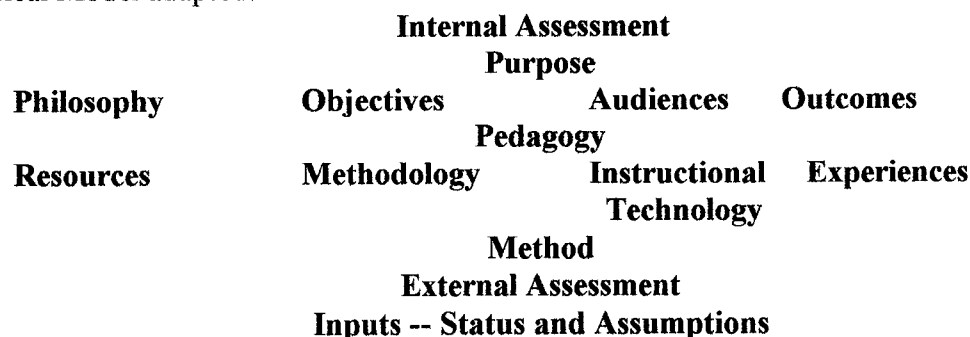
clear purpose, the communicator determines the method to use. The genre portion of method includes the types of communication, such as conversation, lecture, group discussion, written document, or workshop. The process part of method includes the sequence of ideas, word choice, visual or auditory accompaniment, and approach toward drafting or testing ideas. Although this central integration usually begins as a sequence (intention, audience, genre, process), these four elements tend to interact and cross field.

Ultimately, the interaction of purpose and method results in or embodies a communication product, the objective output. The output product is something seen or heard either directly or through some recorded medium. However, the real effect of the communication is not the output itself but the interpretation of that output. The interpretation actually ends the process, whether or not that interpretation matches the intended message of the sender or reflects a different message altogether. The communicator often verifies the actual vs. the intended interpretation through feedback from the other party, through questions of a test of knowledge or skills. Feedback that matches the expected result may indicate successful communication, whereas unexpected feedback means that the communicator must regroup and continue the process.

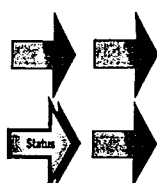
**The Education Process Expands from the
Rhetorical Process**

Both as a communication process and as part of an organizational system, the education process follows the same pattern as that displayed in the Rhetorical Systems Model. Figure 3 presents the Education Process Model which identifies the specific elements of this basic rhetorical process as they apply to Education. The following sections briefly describe each element of the Model, with illustrations of the concepts coming from recent educational theorists and practitioners.

Rhetorical Model adapted:



The educational inputs include both the objective status and the subjective assumptions. The status components concern the resources while the assumptions involve the philosophy for the process.



The process begins with the objective status elements; these elements represent the “givens or limitations within the educational process. The organizational structure examines all of the components of the school, from the division of labor among teachers to the physical layout of the educational setting. And the community linkages indicate the ways in which a given educational program relates to the wider society and specifically those most affected by it.

Faculty qualifications reflect the background and experience of those primarily responsible for the process. Faculty come under increasing scrutiny as society demands greater accountability; and faculty often counter with an emphasis on tenure issues as a way to ensure academic freedom. Thus, the teacher's freedom to expand the realms of knowledge without hindrance encounters the public's need to

ensure the competence of student graduates.

The focus on faculty can incorporate innovative approaches to faculty training, as seen in John Centra's (1994) discussion of teaching portfolios and the need to emphasize specific skills that faculty need to improve, such as motivational, interpersonal, and intellectual skills (pp. 555-570). Others seek to more closely integrate research into the learning process, changing the faculty role from that of knowledge transmission to learning facilitation. Through this shift, faculty move from the *Quality A's* (quality assurance, accountability, audit, and assessment) to *Quality Enhancement* (empowerment, enthusiasm, expertise, and excellence) (Kember & McKay, 1996). Professional teachers want more than a job: professionals have a passion for learning, taking opportunities themselves and challenging their students (Carr, 1997).

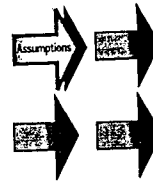
Another significant input into the educational process is the organizational structure. Structure includes the physical facilities representing the space in which interaction occurs, ranging from a dedicated campus, specific building, meeting room, or cyberspace with Internet connection. Physical space can foster or inhibit the learning process (Taylor, 1993). Since education most often takes place within schools or colleges, it occurs within some organizational structure; and like other organizations, schools work with, through, and in spite of the structure. In particular, a bureaucratic structure tends to limit decision

Teaching with Technology in the Modern Classroom: A Learning Systems Model

making by the teachers involved (Palardy, 1994). But from a systems perspective, structure is not just one more element in the educational process. "Our ability to restructure schools," states Cardellichio (1995), "depends on our ability to understand the complex and dynamic relationships between teaching methodology, the structure of school, and types of learning" (pp. 629-632). Similarly, Richard DuFour (1995) concludes that, "Those who seek to bring about meaningful change in a school must address both structure and culture to create the best climate for improvement" (pp. 33-36). Furthermore, organizational structure must realize how to incorporate technology, not just as add-ons to traditional curricula but as integral shifts to the structure of education (Kinnaman & Dyrli, 1995).

At the broader level of input, community linkages indicate the way in which the educational process fits within the wider community, whether as a public or private institution, part of a corporate training program, or even home-schooling. Linkages suggest that educational institutions are not self-contained, isolated dispensers of knowledge; rather, education is art of a wider system that not only provides the student inputs but also uses the resulting output product. Because of this interrelationship, campus reorganization should include discussions with multiple constituencies, including businesses, alumni, parent advisory groups, and citizen advisory groups; and perhaps most significantly, such

discussion needs a sense of humility on the part of the educators involved (Wresch, 1995). Professional societies provide an alternative mechanism for school-industry partnerships (Hemminger, 1994). By fostering such relations with the local community, schools can better serve community needs while gaining an ally from within the community.



The subjective inputs involve a greater range of interpretation, so they bring a greater degree of uncertainty into the process. Assumptions include aspects that educators consciously select, as well as those unconsciously accepted as the unquestioned starting point for actions. Assumptions begin with the philosophy of education and the learning paradigm that guides the overall process in any situation. Just as significantly, it includes the rather amorphous category of campus culture as well as the changing social paradigms in the wider society.

The assumptions begin with the philosophy espoused by the educator. This starting assumption, which significantly

affects the overall process, may reflect such differences as those between Plato and Aristotle, Dewey and Skinner, or idealism and postmodernism. Even positions no longer held may prove insightful; as Becker (1994) indicates, "Although the underlying idealist philosophy has since been repudiated, the vision of unity is still a valuable way of resisting the postmodern trend toward fragmentation" (pp. 177-189). The philosophy may be more limited in scope and related to a given academic discipline. For example, in promoting a liberal democratic approach to teaching, Brunson and Vogt (1996) suggest that an empowering educational philosophy can create a tolerance for ambiguity through an environment of trust and collaborative learning. But as with any other aspect of the process, educators must recognize the difference between sound philosophy and the latest fads -- common sense formalized with a buzzword label where the wheel of education "goes around and around, and we keep recycling" (Kean, 1971). A recent approach to philosophy is the learning paradigm, distinguishing whether students learn by imitation or by self discovery, thus whether the teacher provides information or provides materials for students to employ. The Learning Paradigm by Barr and Tagg (1995) outlines one of the more recent examples of this element. Their work has become the impetus for an annual North American conference on this topic. But a similar discussion can appear under different labels. For example, an article in *Adult Learning* proposes a new assumption

about learning based on collaboration and dialogue, where one's relationships within a societal context form an integral part of the educational experience (Willets, Boyce and Franklin, 1995).

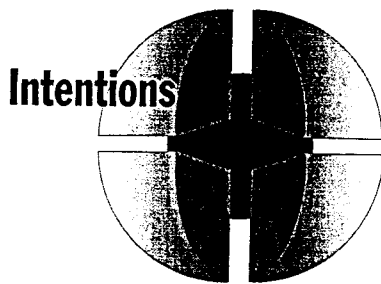
The campus culture, the second element of assumptions, recognizes that the groups involved (students, administrators, teachers, employers) contribute toward creating a unique environment for any educational encounter. The term *culture* is used here in the anthropological sense, combining all of the "givens" of our daily life in a community. Educators can have an influence on that culture, but they can have no absolute control over it, since all participants contribute toward creating the culture. Focusing on the classroom culture is part of the impetus of the learning paradigm, as well as the empowerment approach mentioned above; as Brunson and Vogt continue, "Such an atmosphere can create fundamental change in traditional classroom power relationships because instructors find opportunities to learn about themselves as teachers/learners and students become liberated to explore themselves as learners/teachers" (1996, p. 73).

The concept of culture recognizes real differences among various educational settings. As indicated in the *Journal of Counseling and Development*, "We are fast becoming a multi cultural, multiracial, and multilingual society. Such demographic changes are having a major impact on the

economic, social, legal, political, educational, and cultural systems. For business and industries to survive, they will need to meet the inevitable challenge of cultural diversity” (Sue, 1991, pp. 99-105). Assumptions have a significant impact on the educational process. By their very nature, assumptions are slow to change, since assumptions tend to reflect either the unquestioned basis for actions or the basic values that people hold with tenacity. These assumptions can change, but only if one is willing to clarify and question their underlying assumptions.

Purpose -- Intention and Audience

Central to the education process are the purpose and method elements. Here the purpose elements drive the process, where purpose includes clarifying the intentions and the audience for education.



At the lowest level, intentions involve the course objectives that underlie specific

classroom activities. These short-term activities contribute to the overall program objectives. Together, the activities of all educational entities come under the mission statement for a given program, school, or college. While the mission statements provide the focus for the types of activities, academic standards represent depth to which one carries the process and the quality focus that guides these activities.

At the individual class level, lesson objectives describe the intended outcomes of a given class hour. The objectives determine the desired outcomes, which ideally guide the construction of educational activities. Although lesson planning is ingrained within primary and secondary education, it is more problematic in higher education, as stated most clearly in an opinion column in *The Chronicle of Higher Education*:

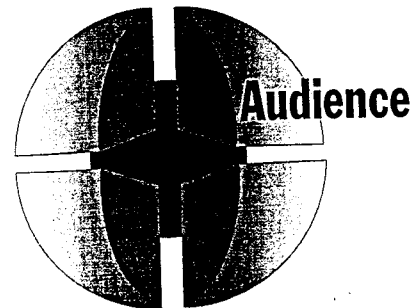
- Higher education rarely deals with the goals of instruction directly and has avoided stating them in measurable terms.
- Courses and programs are rarely designed to provide each student with the chance to attain the competencies we agree on.
- Faculty members receive little reward for devoting significant amounts of time and energy to improving courses and curricula.

- Many people in higher education do not know how to design courses and curricula very well (Diamond, 1997, p. B7).

Whereas primary and secondary education require its teachers to learn how to design courses, higher education only requires that professors be subject matter experts. Knowing a subject and planning lessons, however, are two distinct abilities. To improve this area, colleges may provide faculty development; but often faculty are left on their own for planning. The increasing availability of the Internet provides alternate sources to assist in class planning (Lovely, 1990).

Educators select activities designed to meet individual course and lesson objectives which cumulatively will lead to fulfillment of the program objectives or the institutional mission. The intention of program design is to ensure that learners "experience interest, meaning, and purpose in teaching-learning situations" (Ediger, 1994, pp. 636-639). The stated mission of the program becomes the starting point not just for instruction but for assessment as well; without a clear sense of mission, the institution has no method of evaluating its effectiveness or progress in reaching the mission. For all levels of education, developing the mission or setting the vision becomes a significant step in the educational change process (Weller, Hartley and Brown, 1994).

The third element of intention in the model is determining academic standards. This topic plays a key role in the Goals 200 project for American education, challenging teachers to exact higher standards, to challenge with more difficult texts, and to apply higher-order thinking skills (Curley & Strage, 1996). Without standards, or with weak standards, educators have no reliable way to measure success (Gandal, 1995). For higher education in particular, many analysts decry the lack of or decline in standards. "US colleges academic standards have been compromised by federal subsidies, competition for tuition money, and the idea that all Americans are entitled to a college education" (Gottfried, 1995, pp. 18-20). Gerald Kreychte (1994) goes even further, "Institutions of higher learning have changed radically, making John Cardinal Newman's classic, *The Idea of a University*, an anachronism. Today Americans experience a clear-cut case of academic prostitution" (p. 98). By enforcing standards, teachers can be prepared to deal with a diverse student population (Bennett, 1995), and the challenged students will likely rise to the occasion, breaking the cycle of self-fulfilling prophecies (Shokraii, 1996).



The audience segment of purpose obviously begins with students, the prime target of the educational process. However, the audience involves a wider constituency, including educational leaders and administrators, as well as the employers of graduates as the direct audience.

The focus on students is the first and foremost concern in the education process. Nationally, the student focus appears as a call for greater accountability in public education. At the primary and secondary level, Paul Peterson (1997) states, "If public education in the United States were a business, investors would long since have put their money elsewhere" (pp. 29-33). Other researchers have expressed concern that increased spending in education has not resulted in a parallel increase in student performance; as Hanushek (1997) reports, instances of increased performance "are simply not determined by teacher training, class size, or overall level of spending" (p. 63). Of concern in this equation is the fact that a teacher's career usually does not depend on how well the teacher's students perform. But any change must not be simplistic; for as Hanushek also recognizes, "those who initiate educational reforms must accept that there are varied approaches to learning, and what works for one teacher or student might not work for another" (p. 64). Researchers must continue to clarify how students learn and what motivates them to improve. Teachers must learn to recognize the multiple intelligences of students, thus

finding ways to better meet their needs. Advances in artificial intelligence, while seeming to replace human understanding, actually provide insight into how the mind works. With a systems focus, Harp, Samad, and Villano's (1995) modeling of student knowledge provides engineering insight into the psychology of learning.

Educational leaders comprise the organizational level of the process. At a given school or college, such leaders include department chairs or college deans. But leaders go beyond this lower level, to include institutional executives and particularly the governing boards, which may consist of lay members rather than trained educators. In facing today's issue of quality education, we need leaders at every level to muster vision, courage, and political will in facing these issues. Our modern society at times seems to cry out, "Where are our leaders?" (Kunde, 1994, pp. 17-24). For educational purposes, these leaders need "to get beyond the high-tech phobia," as indicated by Gretchen Cook (1996, pp. 262-266). They need to be taking the forefront to ensure that instructors are prepared with high-powered interactive presentations, interactive brochures, interactive Web sites, taking advantage of the technology that is available. For them to do this, they must invest in searching for funding, securing training, and taking the forefront in translating technology to meet educational objectives and to enhance teaching skills. From an institutional perspective, administrators must

be included in the training process (Brooks, 1998, p. 54). In becoming the driving force behind the process, administrators need a complete understanding of these opportunities so they can make effective decisions. They cannot be above the process, they need to be part of the process.

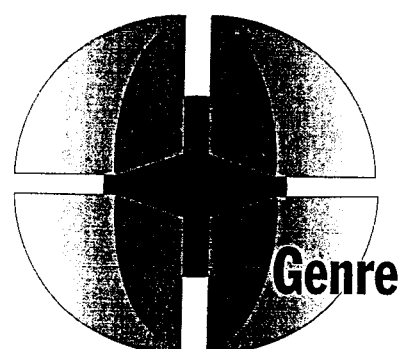
In that way, they can become the driving force so that teachers have the skills to use technology in the modern classroom.

The third audience is that of the employers who hire the students. For our purpose, *employer* includes not only business and industry but also the next level of educational institutions who assume what students have learned earlier. Educators in general may tend to assume that they have a corner on the education market; however, these educators fail to recognize that "the largest educational system in the United States is neither the public schools nor institutions of higher education. It is the education and training workers receive from their employers or in the private marketplace" (Hood, 1996, p. 14).

Although employers provide significant education, they still rely on higher education to provide the starting point. Consequently, higher education must begin to focus on the needs of non-traditional students, especially older students forced back to school because of obsolete skills amid technological advances (Baker, 1993). While the local community and society in general form the wider audience of graduates, employers become a crucial factor in the educational process.

Method -- Genre and Process

The method portion of the education process involves the genres and specific processes used to create the education effort.



The genres focus on the structural components or the mode through the process occurs. These components include instructional technology, interconnectivity, and technological innovations within the society.

Technology involves access to information and the ability to manipulate data in the forms of text, numbers, and laboratory experiments. Technology can include reference books, laboratory equipment, audio/video equipment, computer processors, student networks, Internet connections, and video conferencing. Technology in education has become a significant political issue, with pledges to wire classrooms to the Internet.

The availability of technology has brought expanded possibilities for education (Orlando-Morningstar & Buchanan, 1996), as well as increased expectation for a wider range of classroom applications ("What Do We...", 1995). But technology is not the end in itself, although advanced computers have gone beyond voice recognition and can translate thoughts into words on a screen, they still have limitations. "Obviously computers are quite incapable of original creative thought. The critical issue is that they cannot understand the meaning of their output" (Smith, 1988). Using technology requires changes among faculty, especially those whose personality sees these machines as making education too impersonal (Robbin, 1997).

Using technology requires institutions to conduct extensive orientation and training (Orlando-Morningstar & Buchanan). The difficulty of integrating technology was described in a 1996 Campus Computing Survey: "Instructional integration and user support are the two most important IT [instructional technology] issues that American colleges and universities will confront over the next two to three years" (Weinstein, 1998, p. 1). Some resources identify many practical ways that instructors can incorporate technology into the classroom (Oehring, 1994). Also, discipline-specific applications have expanded at an ever-increasing rate (Monaghan, 1993; Hermanson & Kerfoot, 1994; Velleman & Moore, 1996).

Ultimately, technology must be integrated into the educational process, serving as tools rather than masters. A century after he wrote them, the words of Alfred North Whitehead remain true today: "The best education is to be found in gathering the utmost information from the simplest apparatus" (Whitehead, 1929, p. 11).

Interconnectivity tries to link students, teachers, and institutions more widely in the educational process. Most recent discussions focus on technology as the means of interconnectivity, such as using e-mail to create a community of learners (Parson, 1997), using on-line virtual classrooms (Hiltz & Wellman, 1997), and even teaching through the World-Wide Web (Wildstron, 1997). These approaches try to gain the most out of technological innovation. However, the advent of technology raises other connectivity concerns as well. To begin with, institutions must invest in training so that teachers can better employ this technology for the advancement of students (Hurst, 1994). But perhaps even more importantly, technology must become a link that expands available genres while not necessarily replacing teachers themselves (except as students become life-long learners who have the basics and now merely keep up on their own). As David Hurst (1994) continues, "I firmly believe that computer technology can never replace teachers. As a colleague recently told me, computers are nothing more than a new kind of chalkboard, a tool

to help teachers make their instruction more effective and learning more inviting for a generation weaned on Nintendo, VCRs, and home PCs" (pp. 74-76).

Interconnectivity plays a significant role in the educational process; but beyond technology, student interaction ranges more widely to include such behavior as teacher-student and student-student interaction. Different degrees of interaction would depend on the educational philosophy and specific learning paradigm emphasizing a teacher-centered, student-centered, self-discovery, cooperative-discovery process. This focus provides one way to instill motivation into the process.

Increased interaction can help student performance, but for it to work requires that teachers win students' trust through listening and discussing (Govindarajan, 1991). Even large classes designed as college lectures can benefit from adding time for small-group interaction (Russo, 1995). Interaction takes students out of passive roles, requiring active participation. Interconnectivity begins with one's place within a historical and social context. In identifying the key characteristics of the current "postmodern" age, Zoreda (1970) indicates that "Perhaps the most outstanding trait is the affirmation that there are no ahistorical assumptions; every facet of human culture is a social construction" (pp. 923-935). As this society moves toward the 21st Century, perhaps the most significant social construct is that of

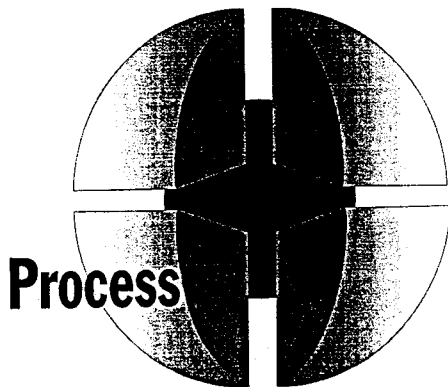
technological innovation.

Changes in technology have accelerated with the introduction of the personal computer in the late 1970s, especially with the drop in cost for machines with increasing capacity that permitted a rapid processing of complex data. With the constant change in machine capability, technological innovation have appeared most significantly in the educational approach to library resources and in how to use the Internet. Gertrude Himmelfarb (1997) describes the library as the heart of the educational institution, where the recent technological changes are the most significant since the invention of the printing press. Technology has permitted a transcending of distances as more courses become available on the World Wide Web (Hayden & Ley, 1997). But more than just availability, push technology will enable a refinement in offerings, thus enhancing the utility of the Internet, especially in saving time during searches (Weinstein, 1998). Such technological changes not only permit educators to explore new options but require them to rethinking the nature of the process:

With dramatic advances in networking technologies, distance education has taken on a new meaning that emphasizes interactivity in learning. However, computer networks are primarily designed for distributing

content. . . . While this new electronic approach increases distribution efficiency, it does not exploit the full potential of the technology as an enabler of a reengineering of the educational process itself (Chellappa, Barua and Whinston, 1997).

As Gilbert (1995) indicates, "The purpose of educational institutions is to make better connections than would otherwise be possible among people who want to learn, people who want to teach, and the world of information and ideas. Let's embrace technologies that can improve these connections" (p. 7).



The process of education examines the sequence of activities and how the parts interact. Traditionally, these elements belong to the category of methodology, the way in which an educator prepares and guides activities for the educational encounter. Process also involves how the current educational activities fit within a

broader pattern, such as a class fitting within an entire course, course fitting within a program, and program fitting into career patterns. Taken together at the societal level, process concerns the wider availability of educational opportunities.

Methodology determines the linkage between the spoken word, the written word, and access tools in a given encounter. Traditional methodology includes combinations of lecture, individual student reading, completion of worksheets, work in small groups, and laboratory experiments. But methodology that reflects the learning paradigm must work with the multiple intelligences of students, reflecting their individual capacity and learning style. Such a methodology will allow for different ways of expressing what has been learned, leading to "performance-based, student-centered education" (McClaskey, 1995, pp. 56-59). Alternate methodology includes multi-sensory methods of teaching, as advocated by E. D. Hirsch, Jr. (1997); and it includes learning contracts, which give students more control over the process, thus improving in knowledge, skills, and responsibility (Greenwood, 1995). For the sciences, alternate methods include laboratory experiences that inspire students to change the way they think about scientific concepts (Westbrook & Rogers, 1996). Such alternatives do not eliminate the teacher; rather, teachers must relate meaning to the information provided, giving students the opportunities for working with the material.

Teaching with Technology in the Modern Classroom: A Learning Systems Model

This approach focuses on student understanding rather than pat answers to rote questions or canned experiments (Coppola, Ege and Lawton, 1997): "This approach empowers students by making them active participants in the learning process while the focus is on process rather than seeking a predetermined answer" (Ege, Coppola and Lawton, 1997, pp. 74-83). Methodology thus becomes a significant element in structuring an educational experience.

Since individual classes are not self contained elements, the program sequence reflects how a class fits into a wider course of instruction, and how courses relate to other courses in a broad program of instruction. "Educators need to pay careful attention to sequence in curriculum development," where the sequence determines when activities occur, and the scope determines the breadth and depth of instruction at a given time (Ediger, 1996). One approach to sequencing emphasizes core knowledge, where

a coherent focus on content leads to higher-order thinking skills more securely than any other approach.... As an added benefit, children acquire knowledge that they will find useful not just in next year's classroom but for the rest of their lives (Hirsch, Storm and Frazee, 1993, pp. 23-30).

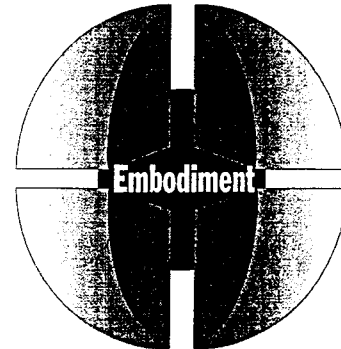
An alternative approach incorporates integrated projects into the curriculum, whereby students learn concepts as needed during a given phase of the project. Such an approach "minimizes the content-driven mind set so that needed skills can be taught and reinforced within the context of a legitimate application" (McFaden, Nelson and Randall, 1996, pp. 1-6). Regardless of which approach, the educator must provide the unifying sequence so that students can relate new objectives with knowledge already acquired. New training sessions must be offered at multiple levels: introductory, intermediate, and advanced. And because of the rapidly changing technology in society, these sessions must be continuous, looking toward open entry and open exit so that teachers are always prepared to bring the latest technology into the modern classroom.

The entire educational process needs to be broadly conceived rather than narrowly constrained. This process needs to recognize multiple levels in society and that adults need to update training throughout their life span, especially in changing careers. In providing these opportunities, we must include business connections as well as technological experts and mentors in meeting their needs for continual training. A model for providing this multilevel approach to education and training appears in the partnership established between the faculty of Celebration School and the Stetson University Center at the Celebration Teaching Academy. This particular

endeavor merges professionals and educators, as well as students of all levels. In particular,

Learners access information in a variety of formats including audio, video, text, graphics, and animation, and demonstrate their understanding using these media in a nonlinear form. Technology can imaginatively enrich the lives of all learners by supporting personalized learning, communication, organization, multi-media productions, and authentic forms of assessment (Leinsing, Rosen and November, 1997, pp. 31-37).
Embodiment -- Pedagogy

Within the education process, the elements discussed so far do not occur in a linear sequence. Rather, they mutually interact to create or to embody the final education product. In the words of Emerson in "The American Scholar, There is never a beginning, there is never an end" (p. 79).



The embodiment element reflects the continual interaction of purpose and method. The initial focus on a student group may change after considering the impact of new instructional technology. Likewise changes in technology may bring about changes in the pedagogy used, which in turn may change the lesson or program objectives. As educators employ the various purpose and method elements, the interactive synergy will yield new insights that ultimately create new educational products. And for the students,

The mind does not perceive just detailed bits and pieces, but is constantly weaving a large pattern from our experiences. If you feed it with multi-impressions that are harmonized and orchestrated to achieve a specific objective,

there's practically nothing it cannot learn (Rose, 1987, p. 116).

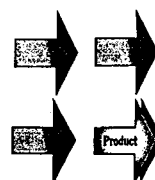
Beyond reflecting its own social conditions, pedagogy provides the way educators sequence diverse elements of the educational process to achieve the greatest benefit for the students. One recent approach to change focuses on excitement in the process: "The Models for Change project team wanted to make equity education interesting, zealous, challenging, exciting and perhaps -- forgive us -- fun" (Ruemper, 1996, pp. 317-333). These educators wanted to add excitement to higher education, believing that "Excitement and interaction stimulate intellectual thinking if participants acknowledge one another, listen to their views, and value their contribution" (Ruemper). Teachers essentially design the process, and their design can focus heavily on teacher presentation, student individual work, or student group work. But the teacher should strive toward the process described by Alfred North Whitehead (1929):

Let the main ideas which are introduced into a child's education be few and important, and let them be thrown into every combination possible. The child should make them his own, and should understand their application here and now in the circumstances of his actual life. From the very beginning of his education the child should experience the joy of

discovery (p. 2).

Output -- Products and Interpretation

All of the assumptions, preparation and decisions ultimately lead to the educational product itself. But the product is not just the objective product but the interpretation of that product.



The outputs from the education process are primarily the classroom itself, the element over which the educator has the greatest impact. From the student's perspective, the output product is the learning experience, which involves how the student assimilates the entire process, both inside the classroom and outside. And finally, the output is the wider curriculum of instruction, usually measured in academic credits, learning hours, or degree programs.

The product begins with the actual classroom instruction itself, whether that instruction is the teacher's lecture, a class workshop discussion, a laboratory assignment, or an individualized computer tutorial. The instruction may include

computer-based training, which some see as a way to reduce learning time and improve learning (Maul & Spotts, 1993). Kinnaman (1995) advocates a blending of resources: "Teachers and technology should be blended to create a balance between the critical and unique contribution of each to the learning process" (p. 98). This blending appears in another research finding, which indicates that "When averaged together, the different kinds of classroom instruction and climate had nearly as much impact on learning as the student aptitude" (Wang, Haertel and Walberg, 1993, pp. 74-79). Ultimately, classroom teaching is an art more than a science: "The art of teaching is defined by the non-quantifiable elements of the transaction between teacher and student that ultimately determine the quality of the student's educational experience. It is not programmable. It requires human intelligence and interaction" (Kinnaman, 1995, p. 98).

The classroom instruction forms part of the wider realm of learning experiences, that include student homework preparation, the class itself, and the mingling of classroom and real-life experiences. Technology has expanded the types of experiences available, and telecommunication has also expanded the nature of the learning experience (Saunders, 1995). However, schools expect teachers to incorporate increased technology while failing to provide sufficient training for teachers (O'Neil, 1995). Only as schools use technology as a mechanism for change will

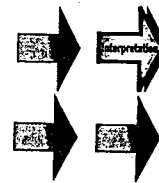
they take advantage of technology's potential. As alternative educational opportunities, work-based learning experiences (Hamilton, M. & Hamilton, S., 1997) and service-based learning (Lewis, 1996) provide the way to expand the learning process by integrating it directly into life experiences. Whether called internships, experiential learning, or cooperative education, these applied learning experiences permit students to test possible career choices while continuing their education (Stalberte, 1996). Overall, the learning experience portion of the educational product range beyond the classroom instruction.

Within the broader educational context, the product is the educational curriculum, ranging from a short-term update workshop to a multi-year degree sequence. A curriculum usually reflects the educator's best efforts at organizing a learning sequence. Successful design depends on appropriate needs assessment, audience design, instructional design, curricular management, and materials selection (Wagner, 1995). Organizations can enhance curriculum development by providing tool kits of exemplary tasks, templates, design criteria, and assessment criteria (Wiggins, 1992). However, modern curriculum development must incorporate the interests of students (Reissman, 1995), even enlisting students in curricular design (Nelson & Frederick, 1994). In catering to students, educators must recognize the

reality of modern society: "New educational technologies designed as much to entertain as to inform present challenges to curriculum design" (Trotter, 1992, pp. 3-7). Differing needs, new technology, and alternative expectations all effect the changing nature of the educational curriculum.

At the societal level, the output of the educational process is providing a wide-ranging community enrichment. However, the society is facing demographic change along with decreased Federal spending, all of which requires increased local responsibility for the educational process. This reduction requires developing effective methods for working with diverse communities, if the community members are to take part effectively in the political process. In particular, communities need to develop skills for working in a multi cultural environment if community members intend to take an active role in their changing society (Gutierrez, Alvarez, Nemon and Lewis, 1996). As the broader outcomes of the educational process, both teachers and adult learners are using the Internet, "learning to ride the technological wave of the future." On this wave, the Internet can help teachers communicate with colleagues, pursue professional development, search on-line databases, interact with students in the classroom, and search for new jobs (Rosen, 1996). Ultimately through the modern educational process, we are leading toward a knowledge-based social order, interweaving homes, schools, offices, and communities

into a "web of intelligent communication services offering unparalleled opportunities for accelerating scientific progress, economic development, education, and other revolutionary changes" (Halal, 1992, pp. 10-15).



Interpretation of the education efforts depends on the student and the wider constituencies. Most people see knowledge as the primary purpose of education, closely followed by competencies. In these two areas, people look for what a student can do (or do better) as the result of an educational process. But the attitude is also a significant interpretation, reflecting the student's approach to education, to broadening life experiences, and to libeling learning. From the institutional perspective, interpreting the educational output reflects in the relative standing of institutions, as well the seamless link between all educational levels from preschool to university to corporate training.

Knowledge is obviously the desired output of the educational process. According to a series of educational

experiments, "Contrary to popular belief, the results of all three experiments suggest that students remember a great deal of what they learn in college courses" (Semb, Ellis, and Araujo, 1993, pp. 305-316). While knowledge or understanding are the preferred outputs, educators often face a significant difficulty: "Memorizing facts and being able to recall them upon demand is frequently the concept of learning perceived by government and regulatory agencies with jurisdiction over the educational system" (Coker, White and Barton, 1993, pp. 242-246). Rather than this limited perspective, educators and regulators must recognize multiple approaches to learning and must avoid using only their own preferred mode of learning (Bachler, 1997). To determine the competencies that students have achieved, educators have recently turned to portfolio assessment as a culmination tool in disciplines as diverse as art, writing, and business; however, portfolio assessment is relatively new in many of the educational disciplines (Karp & Huinker, 1997).

Often overlooked are the attitudes resulting from the process. Attitudes include attitudes about the self, about the subject matter, and about the educational process. "Teachers help students develop taste, discernment and judgment contributing to the growth of perspective" (Kinnaman, 1995, p. 98). Attitudes affect student motivation (Orpen, 1994), and student perceptions of caring from their teachers relates to students' evaluation of teachers, their affective

learning, and their perceptions of cognitive learning (Teven & McCroskey, 1997). The nonverbal immediacy of teachers "has been demonstrated to be substantially associated with increased cognitive and affective learning in students" (McCroskey, Richmond, Sallinen, Fayer and Barraclough, 1995, pp. 281-292). With ever-changing technology and adapting organizations, most educators and employers recognize the need for lifelong education. The attitudes developed from a given educational experience will significantly impact both students and the wider society.

Beyond the level of the individual, the outcomes of the educational process will lead to a new type of standing among educational institutions. Because the technological revolution is so new, as of yet there is no set sequence of who is ahead, who is behind, and who is right on. But preliminary findings indicate that students using interactive styles perform better than those using alternate means of education (Brown, Scalise and Ripley, 1989). These findings are indicative of how the change in the learning paradigm can affect institutions.

Through this process of change, teachers need an increasing range of skills so that they can become innovators and remain in the forefront of the educational process. Most importantly, technology alone will never be the solution to improved education. Rather, teachers who can incorporate technology can bring the best out of the learning process and bring the best out of students. Thus, schools

must implement extensive teacher training, improved curricular materials, and major changes to educational models before it can benefit from increased use of computers.

Feedback -- Assessment and Accountability



Feedback gives multiple perspectives on the overall education process. Such feedback comes internally from those close to the process, as well as those external to the process who serve as an objective review.

The first type of feedback is the internal assessment, driven by self-study of the educators involved. Some of the feedback on students comes in the form of performance on standardized tests, such as Iowa tests of basic skills, the College Boards, and professional engineering or accounting exams. Based on the feedback,

educators can review and modify their process. Ideally, educators integrate assessment with learning as a way to achieve reform (Diez, 1977). Success in such an endeavor requires a systems perspective, with a close examination of educational philosophy and institutional culture. Using a perspective from anthropology, Audrey Kleinsasser (1995) identifies a key distinction in this process: the culture of testing vs. the culture of assessment. In the testing culture, the teacher is judge, evaluator and scorekeeper; however, an assessment culture blurs the distinction between testing and learning, celebrating achievement rather than creating fine lines of distinction between abilities.

A true internal assessment goes beyond standardized tests and teacher input; assessment needs input from class graduates as well as employers of those graduates. Student input often takes the form of end-of-course or end-of-program questionnaires, and such documents often focus heavily on assessing the teachers. Such feedback provides significant input into the assessment process, as long as the data is used appropriately ("Student Ratings of Teacher...", 1977). More recent assessment approaches have expanded the audiences involved in the process to include administrators, employers, parents, as well as students themselves (Reilly, 1995). Such a broader approach views educational not as a self-contained process but as part of the wider social environment.

External assessment comes from those somewhat further removed from the educational process. Community agencies examine how the process fulfills local or state requirements. Regional accrediting agencies examine the entire process, usually focusing on consistency between stated objectives and the actual process. Professional societies focus on the subject matter, determining how well the program reflects industry or professional standards. Assessment has become a significant political issue this decade, ranging from the words used to describe the process to a debate on national testing. Education Secretary Lamar Alexander changed the way of talking about educational achievement, from a focus on the crisis of declining achievement toward a view that "achievement levels are not what they need to be to meet the challenges of the coming decades" (Ralph, Keller and Crouse, 1994, pp. 144-150).

Given the current political climate, politicians and educators recognize that educational effectiveness is a hot political topic. President Clinton pushed for a "voluntary" national testing program in his second administration; but some critics see significant problems in implementing such a system (Schrag, 1997). Not only do the logistics of such a program create an administrative nightmare, but such a program perpetuates a testing rather than an assessment culture. A broader perspective of assessment includes such variables a

classroom assessment, instructional evaluation, accountability and monitoring, counseling and development, and the needs of students, parents, and their community (Cizek, 1995). Implementing such an assessment must start with a "clear vision of the meaning of academic success"; and in this process, schools must do more than rank order students from the highest to the lowest achievers; rather, schools must meet the growing demand for highly competent citizens (Stiggins, 1995, pp. 238-245).

External Assessment comes from a wide range of sources: accreditors, include boards of education for school districts, state agencies who monitor higher education, boards of directors for corporate training programs, as well as the traditional accrediting agencies for geographic regions or for academic specialties. All of these entities provide some means of accountability external to the institution itself. These various accrediting audiences may become a dominant force in the process.

As Angela Sewall (1996) indicates,

The issue is whether we will make the 1990's a decade, not of public criticism of education nor one of governmentally mandated standardization of education but rather a decade in which educators took hold of their destiny and made systemic changes which placed American students and

American education head and shoulders above that of other nations without loss of academic freedom or damage to the principles upon which American public and higher education has been based since the early 19th century (pp. 325-332).

Assessment of performance should become a guide to more effective programs and a means to increase student achievement.

To become such a guide, as Sewell continues, "We must know where we are now and why we are teaching, researching, and serving as we are. We must be able to measure what we are doing in a manner which is clear and understandable to the public as well as ourselves" (Sewall, 1996). Contrary to self-imposed standards is imposition by accrediting agencies. The recent imposition of a political agenda by various accrediting agencies has resulted in a backlash from some institutions. In particular, private colleges with distinct missions geared to a specified student body have challenged the position that some centralized body could impose a political agenda at will (Dillon, 1995). For institutions whose existence revolves around a specific academic philosophy, the imposition of national standards pose a significant risk. What schools need is a "genuinely open and collegial system of accreditation, one that allows governments to catch fraud and abuse and yet steers clear

of political correctness" (Dillon, 1995, p. 42).

The Learning Systems Model

The Educational Process Model identifies (Figure 4) the elements involved in any educational system, ranging from elementary and high school, to corporate training, and to college degree programs. As a model, it indicates relationships between elements rather than the details that apply to any specific educational program. Teachers and administrators can use the model to identify the broad categories they must consider in implementing any educational change.

Identifying the elements that apply to a specific school or program is a significant first step in change. Only through such identification can the educators marshal the support needed to implement any change. The implementation itself, however, is a separate but related issue. Implementation means that many individuals must come together and agree on the content and process of change. In engaging in communication to discuss and plan such a change, each individual brings his or her own rhetorical process into the picture.

In the classroom, the model of the future must incorporate a large variety of teaching techniques to accelerate student learning. This variety of teaching skills must be available to all classes because students

*Teaching with Technology in the Modern Classroom:
A Learning Systems Model*

learn in a variety of ways. Many students have not discovered that they have a personal style of learning that can be used to motivate and accelerate their learning process. Table 1 lists a number of teaching skills and techniques that educators can adapt.

Brainstorming	Models
Buzz Groups	News articles
Chalkboards/Whiteboards	Networking party
with color	Overhead transparencies
Charts	in color
Data-presentation shows	Use of panels
Debate	Picture studies
Demonstration	Problem solving
Discussion--student lead	Project teams
Field trips	Quiz
Films/video	Question & answer session
Games/crossword puzzles	Reports
Imagery	Review in game format
Interview, in class or in field	Role-playing
Internet presentation	Skits
Maps	Storytelling
Memorization games	Symposiums and forums
Mind-mapping	TV presentation
	Visualizations

Conclusion

The primary goal of education at all levels is that students learn how to learn. It is not merely mastering a body of knowledge. In contrast to earlier education, students learn best and most usefully not by being asked to master the conclusions of scholars about questions the students only dimly comprehend, but when they are given raw data, learn to ask their own questions, and come to their own conclusions (Brown, 1996, pp. 267-273).

The educational process has gone through numerous movements, described by buzzwords such as "competency-based education," "student-centered education," and "constructivist curricula," all of which vie for our attention. But ultimately we will recall that "The premium will remain on students learning how to learn, in order to be able to use information literally at their fingertips" (Brown, 1996). This process does not mean that they know everything possible, but that they know how to find information, how to access it, and how to use it. As indicated in *Computer Magazine*,

The technology revolution is shaping many aspects of society, including education. It is important for educators to aggressively pursue skills and methods required to produce designers of the complex information systems demanded. Reengineering the current infrastructure should aim to make the best use of advances in computing and communication technology to improve education (El-Rewini & Mulder, 1997).

List of References

- Bachler, Christopher J. (1997). Competencies All Trainers Need to Have. Workforce, 76(6), 94-95.
- Baker, Merl. (1993). Sharpening the Focus of Viewpoints Between Higher Education and Employers of the Expertise Required for Contemporary Future Technical Managers. IEEE Transactions on Engineering Management, 40(3), 212.
- Barr, R. & Tagg, J. (1995). From Teaching to Learning: A New Paradigm for Undergraduate Education. Change, 27(6), 12-25.
- Becker, Gerhold K. (1994). Unity and University: The Neo-Humanist Perspective in the Age of Post-Modernism. International Philosophical Quarterly, 34(2), 177-189.
- Bennett, Christine I. (1995). Preparing Teachers for Cultural Diversity and National Standards of Academic Excellence. Journal of Teacher Education, 46(4), 259-265.
- Brown, Richard H. (1996). Learning How to Learn: The Amherst Project and History Education in the Schools. The Social Studies, 87(6), 267-273.
- Brooks, Susan. (1996). Knowing the Net. Technology and Learning, 18(7), 54.
- Brunson, D. A. & Vogt, J. F. (1996). Empowering Our Students and Ourselves: A Liberal Democratic Approach to the Communication Classroom. Communication Education, 45(1), 73-83.
- Cardellichio, Thomas. (1995). Curriculum and the Structure of School. Phi Delta Kappan 76(8), 629-632.
- Carr, Deborah A. (1997). Collegial Leaders: Teacher Who Want More Than Just a Job. The Clearing House, 70(5), 240-242.
- Centra, John A. (1994). The Use of the Teaching Portfolio and Student Evaluations for Summative Evaluation. Journal of Higher Education, 65(5), 555-570.
- Chellappa, Ramnath; Barua, Anitesh & Whinston, Andrew B. (1997). An Electronic Infrastructure for a Virtual University. Communications of the ACM, 40(9), 56-58.
- Cizek, Gregory J. (1995). The Big Picture in Assessment and Who Ought to Have It. Phi Delta Kappan, 77(3), 246-249.
- Coker, D. R., White, J. & Barton, L.A. (1994). When Does a Learner Understand Cognitive and Psychological Components in the Process of Understanding. Education, 114(2), 242-246.
- Cook, Gretchen. (1996). Entering the World of Multi-Media Technology. Black Enterprise, 26(11), 262-266.
- Coppola, B.P., Ege, S.N. & Lawton, R.G. (1997). Instructional Strategies and Assessment. Journal of Chemical Education, 74(1), 84-94.
- Curley, R.G. & Strage, A.A. (1996). Instructional Support and Demands: Helping Teachers Help Students Meet Increasing Academic Standards. Education, 117(1), 128-132.
- Diamond, Robert M. (1997). Broad Curriculum Reform is Needed if Students are to Master Core Skills. The Chronicle of Higher Education, 43(47), B7.

*Teaching with Technology in the Modern Classroom:
A Learning Systems Model*

- Dillon, Thomas E. (1995). Coming After U: Why Colleges Should Fear the Accrediting Cartel. Policy Review, 72, 39-42.
- Diez, Mary E. (1977). Assessment as a Lever in Education Reform. National Forum, 77(1), 27-30.
- DuFour, Richard. (1995). Restructuring is Not Enough. Educational leadership, 52(7), 33-36.
- Ediger, Marlow. (1994). Designing the Curriculum. Education, 114(4), 636-639.
- Ediger, Marlow. (1996). Sequence and Scope in the Curriculum. Education, 117(1), 58-60.
- Ege, S.N., Coppola, B.P. & Lawton, R.G. (1997). Philosophy, Curriculum, and the Nature of Change. Journal of Chemical Education, 74(1), 74-83.
- Emerson, Ralph Waldo. (GET SOURCE BOOK). The American Scholar.
- Gandal, Matthew. (1995). Why We Need Academic Standards. Educational Leadership, 53(1), 84-86.
- Gauld, Joseph W. (1996). Meeting Each Student's Unique Potential: One Approach to Education. NAASP Bulletin, 80(583), 43-54.
- Gilbert, Steven W. (1995). The Technology 'Revolution': Important Questions About a Work in Progress. Change, 27(2), 6-7.
- Ginter, E., Brown, S., Scalise, J. & Ripley, W. (1989). Perceptual Learning Styles: Their Link to Academic Performance, Sex and, Academic Standing. Perceptual and Motor Skills, 68(3), 1091-1094.
- Govindarajan, Girish. (1991). Enhancing Oral Communication Between Teachers and Students. Education, 112(2), 183-185.
- Gottfried, Paul. (1995). Yes: Academic Rigor and the Job Market are Victims of the Current System. Insight on the News, 18-20.
- Greenwood, Scott C. (1995). Learning Contracts and Transaction: A Natural Marriage in the Middle. Language Arts, 72(2), 88-96.
- Gutierrez, L., Alvarez, R.A., Nemon, H. & Lewis, E.A. (1996). Multicultural Community Organizing: A Strategy for Change. Social Work, 41(5), 501-508.
- Halal, William E. (1992). The Information Technology Revolution. The Futurist, 26(4), 10-15.
- Hamilton, M.A. & Hamilton, S.F. (1997). When is Work a Learning Experience? Phi Delta Kappan, 78(9), 682-689.
- Hanushek, Eric A. (1997). Incentives are Key to Improve Schools. Forum for Applied Research and Public Policy, 12(3), 62-67.
- Harp, S.A.; Samad, T. & Villano, M. (1995). Modeling Student Knowledge with Self-Organizing Feature Maps. IEEE Transactions on Systems, Man and Cybernetics, 25(5), 727-737.

*Teaching with Technology in the Modern Classroom:
A Learning Systems Model*

- Hayden, Margaret On & Ley, Connie J. (1997). Collaborating with Technology: Teaching a Class on the World Wide Web. Journal of Family and Consumer Sciences, 89(2), 25-28.
- Hemminger, Karen. (1994). ASM Begins School Partnerships Program. Advanced Materials and Processes, 145(2), 47-48.
- Hermanson, Christine & Kerfoot, Joan. (1994). Technology Assisted Teaching: Is It Getting Results? American Music Teacher, 43(6), 20-23.
- Hesse, Mary. (1967). Models and Analogy in Science. Encyclopedia of Philosophy, Vol. 5. New York: Macmillan Publishing Co., 354-359.
- Hiltz, Starr Roxanne & Wellman, Barry. (1997). Asynchronous Learning Networks as a Virtual Classroom. Communications of the ACM, 40(9), 44-49.
- Himmelfarb, Gertrude. (1997). Revolution in the Library. American Scholar, 66(2), 181-197.
- Hirsch, E.D. Jr., Strom, J. & Frazee, B. (1993). The Core Knowledge Curriculum: What's Behind Its Success. Educational Leadership, 50(8), 23-30.
- Holzman, Michael. (1993). Reading Writing and Ripoffs. Washington Monthly, 27(7-8), 13-16.
- Hood, John. (1996). The Market Approach to Job Training. Policy Review, 77, 14-15.
- Hurst, David. (1994). Teaching Technology to Teachers. Educational Leadership, 51(7), 74-76.
- Karp, K.S. & Huinker, D. (1997). Portfolios as Agents of Change. Teaching Children Mathematics, 3(5), 224-228.
- Kates, Robert W. (1971). Natural Hazard in Human Ecological Perspective: Hypotheses and Models. Economic Geography, 47, 438-451.
- Kean, Patricia. (1993). Reading Writing, and Ripoffs. Washington Monthly, 25(7-8), 13-16.
- Kember, D. & McKay, J. (1996). Action Research into the Quality of Student Learning: A Paradigm for Faculty Development. Journal of Higher Education, 67(5), 528-554.
- Kinnaman, Daniel E. (1995). Schools Need Good Teachers and Good Technology. Technology and Learning, 15(8), 98.
- Kinnaman, Daniel E. (1995). Part 2: Developing a Technology-Powered Curriculum. Technology and Learning, 15(5), 46-51.
- Kleinsasser, Audrey M. (1995). Assessment Culture and National Testing. The Clearing House, 68(4), 205-210.
- Kreychte, Gerald F. (1994). The Prostitution of Higher Education. USA Today (Magazine), 123(2594), 98.
- Kunde, James E. (1994). American Renewal: The Challenge of Leadership. National Civic Review, 83(1), 17-24.
- Leinsing, Donna; Rosen, Larry S. & November, Alan. (1997). Building a Community of

*Teaching with Technology in the Modern Classroom:
A Learning Systems Model*

Excellence. National Forum, 77(1), 31-37.

Lewis, Barbara A. (1996). Serving Others Hooks Gifted Students on Learning. Educational Leadership, 53(5), 70-74.

Lovely, Gail. (1997). Need Lesson Plans? They're Ready for You on the Net! Instructor (1990), 106(5), 102.

Maul, G.P. & Spotts, D.S. (1993). A Comparison of Computer-Based Training and Classroom Instruction. Industrial Engineering, 25(2), 25-27.

McClaskey, Janet. (1995). Assessing Student Learning Through Multiple Intelligences. English Journal, 84(8), 56-59.

McCroskey, J.C.; Richmond, V.P.; Sallinin, A.; Fayer, J.M. & Barraclough, R.A. (1995). A Cross-Cultural and Multi-Behavioral Analysis of the Relationship Between Nonverbal Immediacy and Teacher Evaluation. Communication Education, 44(4), 281-292.

McFaden, D.M.; Nelson, B.A. & Randall, C.M. (1996). Redesigning the Model: A Successfully Integrated Approach to Teaching and Learning. NASSP Bulletin, 80(577), 1-6.

McKeon, Richard. (1971). The Uses of Rhetoric in a Technological Age: Architectonic Productive Arts. The Prospect of Rhetoric: Report of the National Development Project. Lloyd Bitzer and Edwin Black, eds. Englewood-Cliffs, NJ: Prentice-Hall, Inc. 44-63.

Monagham, Peter. (1993). Using the Newest Technology to Illuminate the Earliest. Chronicle of Higher Education, 39(25), A-19 to A-20.

Mosteller, F.; Light, R.J. & Sachs, J.A. (1996). Sustained Inquiry in Education: Lesons from Skill Grouping and Class Size. Harvard Educational Review, 66(4), 797-842.

Mudd, Samuel. (1983) Briggs' Information-Processing Model of the Binary Classification Task. Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.

Nelson, R.J. & Frederick, L. (1994). Can Kids Design Curriculum? Yes! Education Digest, 59(8), 42-45.

Newman, Denis. (1992). Technology as Support for School Structure and School Restructuring. Phi Delta Kappan, 74(4), 308-315.

Oehring, Sandee. (1994). Teaching with Technology. Instructor (1990), 103(9), S-8 to S-13.

O'Neil, John. (1995). On Technology and Schools. Educational Leadership, 53(2), 6-12.

Orlando-Morningstar, D. & Buchanan, J.M. (1996). The Virtual Classroom: Using On-line Conferencing to Deliver Training and Education. Federal Probation, 60(4), 11-17.

Orpen, Christopher. (1994). Academic Motivation as a Motivator of the Effects of Teacher Immediacy on Student Cognitive and Affective Learning. Education, 115(1), 137-138.

Parson, Paula T. (1997). Electronic Mail: Creating a Community of Learners. Journal of Adolescent and Adult Literacy, 40(7), 560-562.

Palardy, Michael J. (1995). Needed: School Reorganization. Education, 114(3), 399-401.

*Teaching with Technology in the Modern Classroom:
A Learning Systems Model*

- Peterson, Paul E. (1997). A Report Card on School Choice. Commentary, 104(4), 29-33.
- Ralph, John; Keller, Dana & Crouse James. (1994). How Effective Are American Schools? Phi Delta Kappan, 76(2), 144-150.
- Reilly, Kathleen C. (1995). Expanding Audiences: Breaking the Circle of Assessment. The Clearing House, 68(4), 240-243.
- Reissman, Rose. (1995). Shop, Hang Out, Keep Current, Read: Training for Curriculum Design. English Journal, 84(1), 93-96.
- Robbin, Katherine L. (1997). Does Good Technology Outweigh the Bad? Christianity Today, 41(11), 94-96.
- Rose, Colin. (1987). Accelerated Learning. New York: Dell Publishing Company, 116.
- Rosen, David J. (1996). Learning to Ride the Wave of the Future: How Adult Students and Teachers are 'Surfing' the Internet. Adult Learning, 8(1), 15-17.
- Ruemper, Wendy. (1996). Models for Change: Antiracist Education for Universities and Colleges. The Canadian Review of Sociology and Anthropology, 33(3), 317-333.
- Russo, Thomas. (1995). A Collaborative Learning/Assessment Model. Art Journal, 54(3), 82-83.
- Saunders, Laverna. (1995). From the Editor. Computer in Libraries, 15(3), 47.
- Schrag, Peter. (1997). Testing, Testing: Clinton's Exam Flunks. The New Republic, 217(17), 14-16
- Semb, G.B.; Ellis, J.A. & Araujo, J. (1993). Long-Term memory for Knowledge Learned in School. Journal of Educational Psychology, 85(2), 305-316.
- Sewall, Angela Maynard. (1996). From the Importance of Education in the 80's to Accountability in the 90's. Education, 116(3), 325-332.
- Sheran, T. & Sheeran, M.F. (1996). Schools, Schooling and Teachers: A Curriculum for the Future. NAASP Bulletin, 80(580), 47-56.
- Shokraii, Nina H. (1996). Raising the Bar: Minority Pupils Excel the Old-Fashioned Way. Policy Review No. 7, 52-56.
- Skinner, E.A. & Belmont, M.J. (1993). Motivation in the Classroom: Reciprocal Effects of Teacher Behavior and Student Engagement Across the School Year. Journal of Educational Psychology, 85(4), 571-581.
- Smith, E. Lester. (1998). Inner Adventures: Thought, Intuition, and Beyond. Wheaton, IL: Theosophical Publishing House.
- Stahl, Larry C. (1995). A Proposed New Symbolic Model for Modern Education. Education, 115(4), 593-596.
- Stalberte, Tahira S. (1996). Applied Learning: Internship and Co-op Opportunities. The Black Collegian, 27(1), 68-69.
- Stiggins, Richard J. (1995). Assessment Literacy for the Twenty-First Century. Phi Delta

*Teaching with Technology in the Modern Classroom:
A Learning Systems Model*

Kappan, 77(3), 238-245.

Student Ratings of Teacher Effectiveness: Use and Misuse. The Midwest Quaterly, 38(2), 18-33.

Sue, Derald Wing. (1991). A Model for Cultural Diversity Training. Journal of Counseling and Development, 70(1), 99-105.

Taylor, Anne. (1993). How Schools are Redesigning Their Space. Educational Leadership, 51(1), 36-41.

Teven, J.J. & McCroskey, J.C. (1997). The Relationship of Perceived Teacher Caring with Student Learning and Teacher Evaluation. Communication Education, 46(1), 1-9.

Theobald, P. & Nachtgal, P. (1995). Culture, Community, and the Promise of Rural Education. Phi Delta Kappan, 77(2), 132-135.

Trotter, Andrew. (1992) Technology in Classrooms: "That's Entertainment". Education Digest, 57(5), 3-7.

Velleman, Paul F. & Moore, David S. (1996). Multimedia for Teaching Statistics: Promises and Faults. The American Statistician, 50(3), 217-225.

Wagner, Ellen D. (1995). Distance Education Factors. Adult Learning, 7(1), 18-20.

Wang, M.C.; Haertel, G.D. & Walberg, H.J. (1993). What Helps Students Learn? Educational Leadership, 51(4), 74-79.

Weinstein, Peter. (1998). Pushing and Pulling on the Web. Technology and Learning, 18(5), 1996 Campus Computing Survey, 24-25.

Weller, L.D. Jr.; Hartley, S.H. & Brown, C.L. (1994). Principals and TQM: Developing Vision. The Clearing House, 67(5), 298-301.

Westbrook, S.L. & Rogers, L.N. (1996). Doing is Believing: Laboratory Experiences Promote Conceptual Change. School Science and Mathematics, 96(5), 263-271.

What Do We Really Do with Technology? (1995). Change, 27(2), 15.

Whitehead, Alfred North. (1929). The Aims of Education. The Aims of Education and Other Essays. New York: MacMillan Publishing, 11.

Wigging, Grant. (1992). Creating Tests Worth Taking. Educational Leadership, 48(8), 26-33.

Wildstron, Stephen H. (1997). The World Wide Classroom. Business Week, no. 3559, 18.

Willets, J.W.; Boyce, M.E. & Franklin, C.A. (1995). Praxis as a New Method in the Academy. Adult Learning, 6(6), 10-11.

Wresch, William. (1995). Campus Reorganization: A Need for New Voices. The Chronicle of Higher Education, 42(14), B3.

Zoreda, Margaret Lee. (1970). Cross-Cultural Relations and Pedagogy. American Behavioral Scientist, 40(7), 923-935.

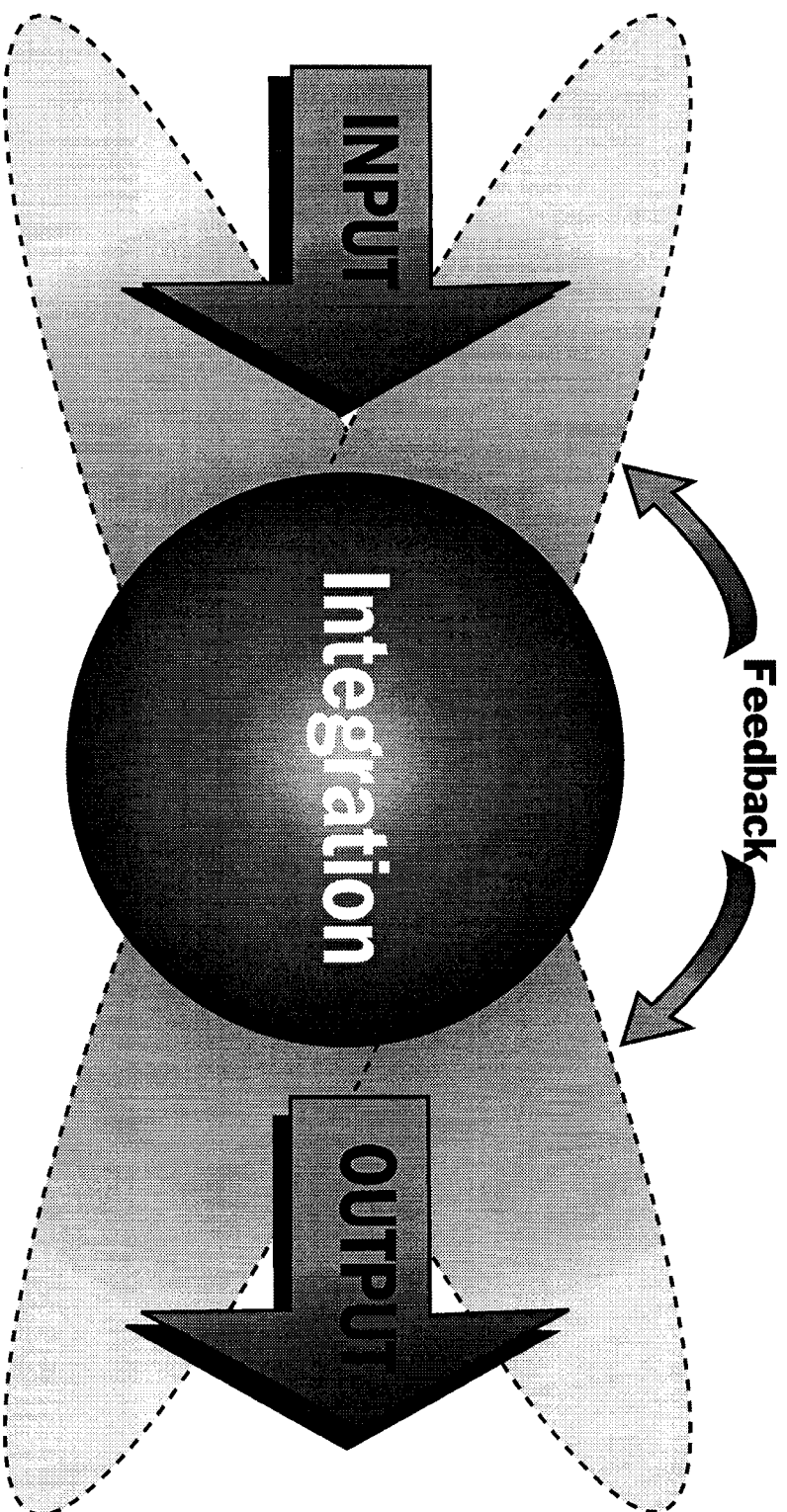


Figure 1 Basic System

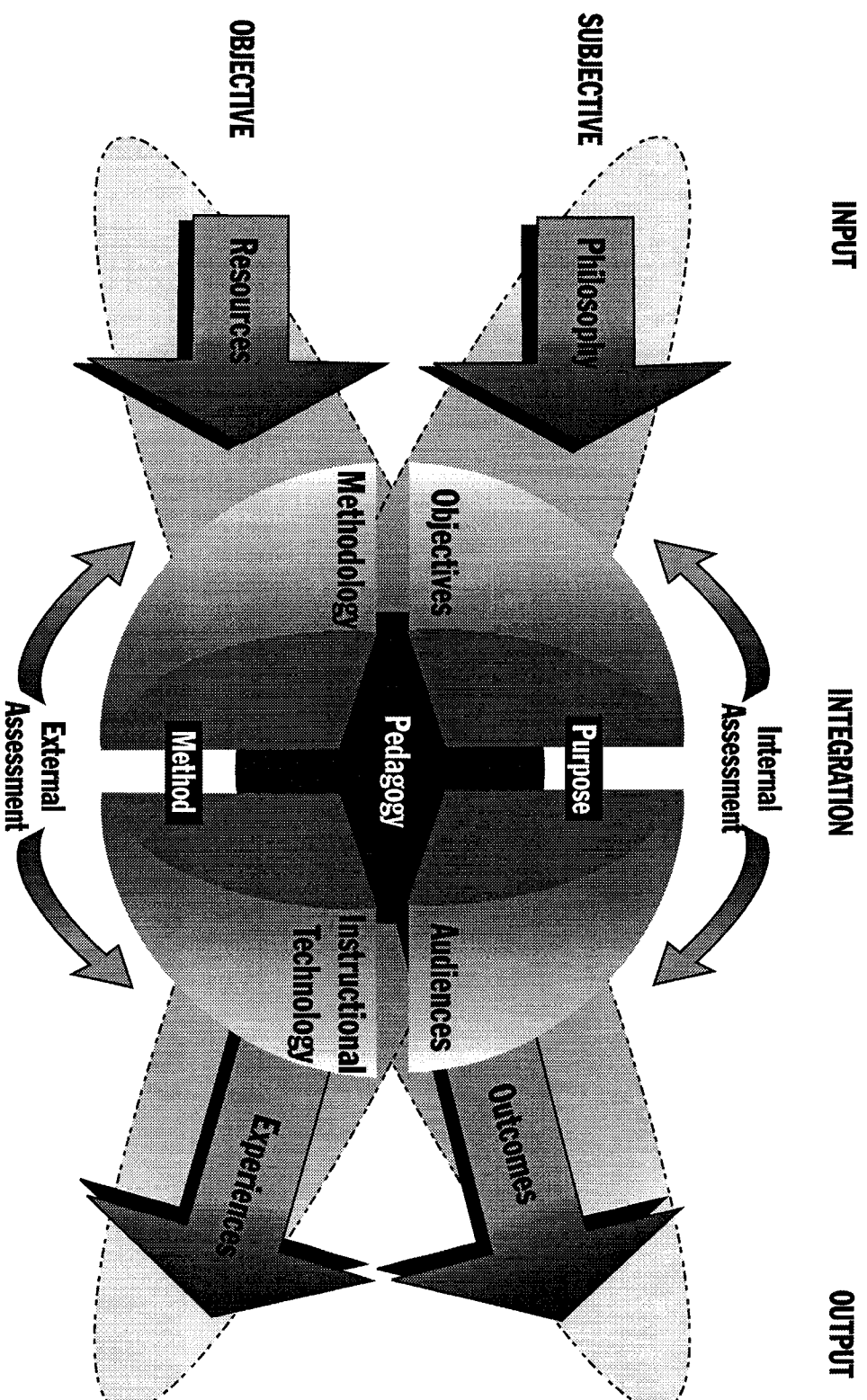


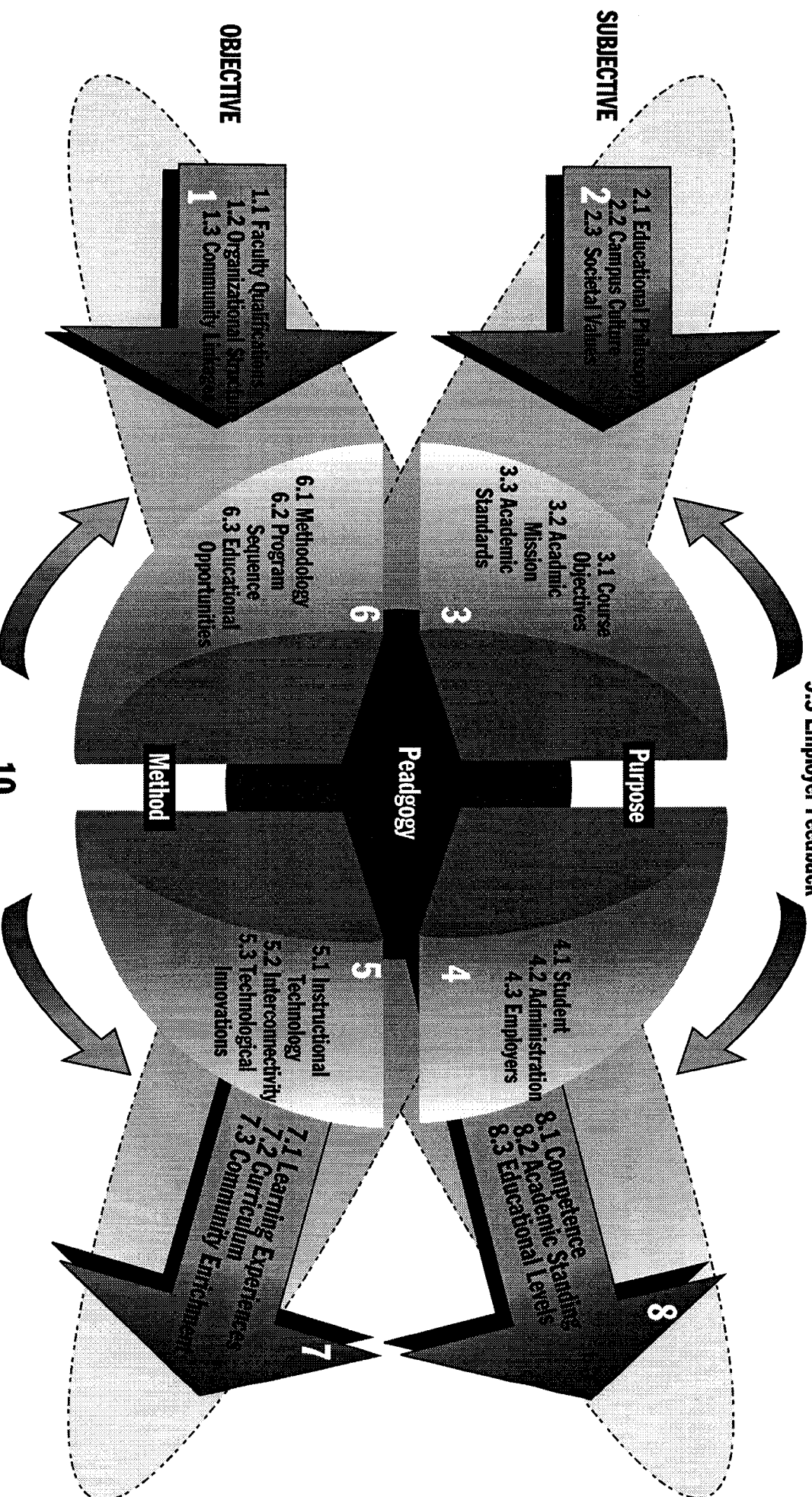
Figure 3: Learning Paradigm Model

INPUT

9. Internal Assessment

- 9.1 Graduate Feedback
- 9.2 Self Studies
- 9.3 Employer Feedback

OUTPUT



SUBJECTIVE

OBJECTIVE

10. External Assessment

- 10.1 Graduate Longtutinal Studies
- 10.2 Academic Process
- 10.3 Community Responsiveness

1. Individual
2. Organization
3. Society